

Of the seed plants in this list 24 are endemic; 10 reach other parts of Western Malaysia; two pass just outside, one to Celebes the other to Mindoro; and the rest are much more widespread; *Melastoma malabathricum* reaching the Seychelles, *Engenia zeyanica*, *Uncaria dasyoneura*, *Psychotria sarmentosa*, *Chasalia lurida*, and *Gaertnera Koenigii* reaching Ceylon, *Vitis trifolia* reaching Himalaya, *Similar laevis* reaching China, and *Illicum cambodianum* reaching French Indo-China.

The percentage of endemism is about 55 or not different from that found in the forest of Fraser Hill taken as a whole.

SUMMARY. When a traveller ascends from the Semangkok pass to Fraser Hill, he passes at about 3300 feet out of a very lofty forest into one of lesser growth—its tall trees being 80-100 feet high at Fraser Hill. At a little distance from Fraser Hill where the range runs higher, about say 4700 feet, another type of forest appears, being of lesser growth and more mossy. The forest which we have studied especially is a part of that between 3300 and 4700 feet, namely that at Fraser Hill itself between 4000 and 4370 feet. Of its woody shading plants 57% are confined to the Peninsula, of its epiphytes 64% and of its ground vegetation (seed plants) 63%. These are high percentages, and indicate a considerable isolation of the mountains of the Peninsula. The species of the forest which are not endemic exist for the most part as lowland plants in the south of the Peninsula: by doing which they suggest that when the Peninsula was joined by land to Sumatra or to Borneo the land bridge was in climate and want of elevation as Johore and Singapore. It is clear that the montane species did not cross it. These montane species were evolved locally from typically Malaysian genera, and do not declare themselves immigrants evolved elsewhere. All their genera except *Daphne*, *Geostachys*, and *Nenga* are known from Borneo and all except *Leptorrhyncha*, *Blastus*, *Anerincleistus*, *Phyllagathis*, *Filitia*, *Dacrydium*, *Agathis* (introduced however) *Camptandra*, *Geostachys* and *Joinvillea* are known from Java: whereas as many as 60 of the genera are absent from Ceylon.

We recognise as present another flora—the flora that requires open ground. It is small and of mixed origin, for there are in it species whose genesis would seem to be upon ground bared by landslides, and there are intruders following man. The flora is rather small for analysis though very interesting.

PART II.

Enumeration of the Seed-Plants, Ferns and Mosses Collected.

In this enumeration the literature cited is the last only which sums up in any way the distribution of the plants in various parts of Western Malaysia.

Abbreviations: G.=Gunong or mountain: P.=Pulau or island (s.n.)=specimen sine numero, an unnumbered specimen: and of Works quoted:—

King, Sir George, Materials for a Flora of the Malay Peninsula in the Journal of the Asiatic Society of Bengal vols. 48 to 75, continued by Mr. J. S. Gamble, with the assistance of Sir David Prain, Dr. O. Stapf, Mr. H. N. Ridley, M. C. deCandolle, Prof. J. M. Macfarlane, quoted as King, Mat., Prain, Mat., etc.

Ridley, H. N., Materials for a Flora of the Malay Peninsula Monocotyledons, Singapore, 1908, 3 vols. quoted as Ridley, Mat. Monoc.

Koorders, Excursions-flora von Java, 3 vols. quoted as Koorders.

Smith, J. J., Orchideen von Java, Leiden 1905, quoted as Smith, J. J.

Merrill E. D., A bibliographic enumeration of Bornean plants in the Journal of the Straits branch of the Royal Asiatic Society, special no., 1921. quoted as Merrill.

Ames, O., in the last named, quoted as Ames.

WINTERACEAE.

Illicium cambodianum, Hance: King, Mat., 58, pt. 2, 374. A small tree distributed within the Peninsula and in Indo-China: within the Peninsula it is montane occurring on Kedah peak, on the Taiping hills, on G. Tahan, and down the tops of the Main range from the mountains of Telom to G. Mengkuang Lebar; on Benom; then on Mt. Ophir. It is common about Fraser Hill particularly upon vein-quartz ridges. The claret flowers smell of anise: they are produced both on the old wood and on the ends of branches and turn down. The stigmas overtop the anthers by a little and spread into a ring as the fruit forms. The Malays call the tree Bakau bukit or hill mangrove. because its red wood suggests mangrove wood.

MAGNOLIACEAE.

Talauma Candollei, Blume: Koorders, 2, p. 240: Merrill p. 251: *T. mutabilis*, Blume. King, Mat., 58, pt. 2, p. 373. A shrub very variable in its different varieties, distributed from Sumatra and from Pungah in Lower Siam through the Peninsula to West Java and North Borneo. In the Peninsula it occurs on Kedah peak, in Penang and on the Main range from the mountains of Telom to the Semangkok pass. It was got coming into flower (8860).

Kadsura? A big climber, flowerless, but appearing as if *Kadsura lanceolata*. King, was found at 3,300 ft. under Fraser Hill towards Tras. (7868). The Malays call it Akar belewar.

ANONACEAE.

Uvaria sp. A big liane with a stem 4 in. through, unfortunately without flowers and without fruit. (8804).

Polyalthia pulchra, King, Mat. 60, pt. 2, p. 55. A small tree, endemic within the Peninsula, and montane, distributed upon the Taiping hills and G. Bubu: upon the Main range from G. Kerbau to G. Mengkuang Lebar. It was obtained on Pine-tree hill at 4500 ft. (8533) in fruit. The fruit-stalks are coral-pink.

Goniothalamus macrophyllus, King, Mat. 60, pt. 2, p. 76. Koorders, 2, p. 252: Merrill, 260. A small shrub, little branched, distributed from Sumatra eastward to mid Java and north Borneo: in the Peninsula in the north montane, and is in Lankawi, and P. Adang, Penang, on the Taiping hills, and on the Main range of Perak, south to the Semangkok pass: further it occurs down approximately to sea level in Johore and Singapore. It was both in flower and fruit (8507, 8957): the wood is fragrant suggesting cinnamon. The Malays call it Tungging.

Goniothalamus sp. A small tree 30 ft. high found in flower (8896) and in fruit (7809), which matches none of the Peninsula species. The Malays call it Tampaian.

Anonacea. A tree of medium size, densely covered under the leaves with tawny felt, occurring upon the vein-quartz ridges (8684, 8930).

MENISPERMACEAE.

Limacia triandra, Miers: King, Mat. 58, pt. 2, p. 382. A climber, within the Peninsula, and extended northwards to Moultmein and French Indo-China: in the Peninsula montane, occurring in Lankawi, in Penang, on Kedah peak; and upon the Main range about Fraser Hill (8620) and on Bukit Kutu.

PITTOSPORACEAE.

Pittosporum sp. A bush with larger fruits than *P. ferrugineum*, Dryand, and not tawny under the leaves, but otherwise rather similar; as known at present quite local: it was obtained by Mr. Ridley at the Semangkok pass in 1904 (no. 12073) and now has been gathered at Fraser Hill (s. n.).

POLYGALACEAE.

Polygala venenosa, Juss.: King, Mat. 59, pt. 2, p. 130: Merrill, p. 324. A herb of the interior of Malaysia: in Sumatra, common in the forests of the Peninsula upon the mountains and to their feet sometimes, extended through Borneo to the Philippine islands. In the Peninsula recorded from Kedah peak, Penang, the Taiping hills, the Main range from G. Kerbau and the mountains of Telom to G. Tampin. It was found to be plentiful in the forest of Fraser Hill both in flower and with half ripe fruit (8590).

Xanthophyllum excelsum, Miq. Merrill p. 326: *X. affine*, Korth.: King, Mat. 59 pt. 2 p. 142: Koorders, 2 p. 453. A tree of the second rank in the forest, distributed from Tenasserim through western and north-eastern Malaysia extending from the Peninsula to Billiton and Java and through Borneo to the Philippines. It extends north to Tongkah in Lower Siam (lat. 8° N.), and southwards to Singapore both in the plains and on the hills. It was less common at Fraser Hill than *X. Maingayi*.

Xanthophyllum Maingayi, Hook. f.: King, Mat., 59 pt. 2. p. 136. An endemic small tree, distributed within the Peninsula, montane, on Penang, on the Taiping hills, and on the Main range from Perak to G. Tampin. About Fraser Hill it is numerically the commonest woody plant, being the universal under-tree of the hundred-feet high forest (8613). Like others of its genus the Malays call it Minyak berok, or baboon's oil.

CARYOPHYLLACEAE.

Drymaria cordata, Willd. Koorders, 2 p. 214. A weed which is to be considered as introduced through man into Malaysia, but from not-remote parts of Asia. It occurs in Sumatra through Java up to 6500 ft. In the Peninsula it occurs about Fraser Hill (7848) very sparingly, upon the roadside near to the Gap on the Semangkok pass, and at Ginting Sempah on the crest of the Kuala-Lumpur-Bentong road.

PORTULACACEAE.

Portulaca oleracea, Linn.: King, Mat., 60, pt. 2, p. 84: Koorders, 2, p. 208: Merrill, p. 247. A weed of all warm countries: in the Malay Peninsula scattered up and down. It was found at about 3300 ft. on the road from the Semangkok pass to Fraser Hill.

GUTTIFERAE.

Calophyllum spectabile, Willd. King, Mat., 59, pt. 2, p. 175: Koorders, Java, 2 p. 617. A *Calophyllum* apparently this, but without flowers and without fruit, was collected at Fraser Hill. *C. spectabile* is a wide-spread tree occurring from the Andamans and Nicobars and Cochin-china through Malaysia to Fiji and the Society Is.

TERNSTROEMIACEAE.

Ternstroemia Scortechinii, King, Mat., 59, pt. 2, p. 193. A medium-sized endemic tree. It is known to occur on the Taiping hills, and on the Main range from the mountains of Telom to Fraser Hill, and is on Benom. It is probable that it is also on G. Tahan. At Fraser Hill it was found attaining 30 ft. in height and in fruit (7754 bis).

Adinandra acuminata, Korth.: King, Mat., 59, pt. 2, p. 189. A tree of second rank occurring in Sumatra and the Malay Peninsula. In the Peninsula it is not uncommon from Penang and

Taiping to Singapore. In the south of the Peninsula it grows at sea-level: but it is one of those species which in the north scarcely descend so low. It has not before this been got on the Main range (8947) unless some of the material at Calcutta came thence.

Adinandra dumosa, Jack: King, Mat., 59, pt. 2, p. 188: Koorders, 2, p. 611: Merrill, p. 391. A small tree distributed through Malaysia. In the Peninsula it is frequent at low elevations: but has been got at 3000 ft. on Kedah peak and on Mt. Ophir (Ridley in Jour. F. M. S. Mus. 7, p. 39). It occurs in the Andamans and the Nicobars. At Fraser Hill it is common: but the Fraser Hill specimens all fail to dry black as *A. dumosa* normally does. It attains there 50 ft. in height (7760). Mr. Cubitt's no. 6527 from Fraser Hill is the same as ours.

Schima Noronhae, Reinw.: King, Mat., 59, pt. 2, p. 201: Koorders, 2, p. 610: Merrill, p. 390. A fairly large tree, distributed from Lower Burma, and Sumatra into the Malay Peninsula, to Java, Borneo and Palawan: in the Peninsula most frequent in the north, and not quite to sea level; reaching 5,000 ft. on G. Tahan and on the Taiping hills. At Fraser Hill it is common, and was in flower.

Gordonia sp. The yellowish flowers of a species of this genus were seen on the ground between Fraser Hill and Pine tree hill; but the tree whence they had fallen could not be identified.

Saurauia nudiflora, D. C.: King, Mat., 59, pt. 2, p. 198: Koorders, 2, p. 604. A small tree in distribution in Sumatra, through Java and in the Malay Peninsula on the Taiping hills, on G. Tahan and on the Main range of Perak and Selangor. It is favoured by the interference of man, and takes possession of cleared areas: below Fraser Hill it was plentiful on slopes that had been mined at 3000-4000 ft. (7764, 7873), attaining 20-25 ft. in height. It is called Jelatang Gajah, or Elephant nettle.

Saurauia rubens, Ridl. in Jour. Str. Br. Roy. As. Soc. 61, p. 1: A small endemic and very local tree producing its pendent flowers close to the base of the trunk in large groups. It carried flowers and fruit at Fraser Hill (8585): these fruits when ripe fall off their pedicels, which persist for a time. Curtis found it in flower in the same neighbourhood in May 1902, and Ridley in April 1911.

DIPTEROCARPACEAE.

Dipterocarpus cornutus, Dyer: King, Mat., 61, pt. 2, p. 93. A lofty tree occurring down the Peninsula from Kedah to Singapore: and ascending the Main range on the east side under Fraser hill to about 3300 ft. where it was in flower (s. n.).

Shorea bracteolata, Dyer: King, Mat., 61, pt. 2, p. 117. This lofty tree ascends to about 3300 ft. on the Selangor face of the hills under Fraser Hill. The species is distributed from Penang to Malacca and in Pahang, within the Peninsula, and is in Sumatra.

MALVACEAE.

Urena lobata, Linn.: King, Mat., 60, pt. 2, p. 43: Koorders, 2, p. 583: Merrill, p. 374. A pan-tropic weed. In the neighbourhood of Fraser Hill it follows man, as it is quite foreign to the forest which is the natural vegetation there: it is therefore most abundant where the land has been mined. Machado collected it near the Semangkok pass in 1903. Ridley in 1910 on Sakai clearings further north.

TILIACEAE.

Grewia fibrocarpa, Mast.: King, Mat., 60, pt. 2, p. 111. A tall bush, endemic, distributed generally in the lower ground of the Peninsula from Penang to Singapore, and upon the east side known from the islands of P. Tioman and P. Tinggi. It occurs at Fraser Hill in forest and carries its scarlet fruits (8606), one only as a rule as the result of a whole panicle of flowers. The pulp is not unpleasantly acid.

Leptonychia heteroclita, Kurz: Merrill, p. 378: *L. glabra*, Turcz.: King, Mat., 60, pt. 2, p. 94. A shrub, in distribution from Tenasserim and the Andamans down the Malay Peninsula to the northern edge of Johore and in Sumatra, to Borneo and to Celebes. It was found on the edge of a gully at Fraser Hill (7870), and it has been collected before near Fraser Hill (Ridley 15586) and G. Kerbau and in the mountains of Telom.

Elaeocarpus gambir, Becc.: Merrill, p. 370: *E. stipularis*: King, Mat., 60, pt. 2, p. 133: Koorders, 2, p. 369. A tree of moderate size and quick growth, able to take advantage of the clearings of man. It is distributed through western Malaysia except eastern Java and is in Tenasserim. In the Peninsula it occurs under the mountains in the north as well as on them; and in the south it is down at sea-level. It was in flower and in fruit at Fraser Hill and had attained 40 ft. in height; it carried a sprinkling of red dying leaves (7794) on fruiting branches.

Elaeocarpus jackianus, Wall.: King, Mat., 60, pt. 2, p. 137. A small endemic tree which is able to take advantage of the clearings of man. In distribution it is general down the western side of the Peninsula: in Penang it occurs from the coast to the hill-tops at 2500 ft.: it is common at low elevations in Perak and down through Selangor and Malacca to Singapore. About Fraser Hill in places that have once been cleared, young plants of this are very conspicuous (7788), which by their cordate leaves may be distinguished varietally, as var. *cordata*, the leaves being 22 x 12 cm.; the berries sparingly pilose: their pedicels very hispid.

Elaeocarpus paniculatus, Wall.: King, Mat., 60, pt. 2, p. 129: Merrill, p. 371. A tree of the Malay Peninsula Banca and northern Borneo: it occurs in the lowlands of the Peninsula from Lankawi and Kuantan to Singapore: from the hills it has scarcely been recorded. At Fraser Hill it was found flowering sparingly (8567).

Elaeocarpus reticulatus, Ridl. in Jour. Str. Br. Roy. As. Soc. 61, p. 2. A bush about 6 ft. high carrying its berries upright; endemic and confined to the Main range from G. Kerbau to G. Mengkuang lebar. It was got at 7000 ft. on G. Kerbau, at 5000 ft. on G. Mengkuang lebar: at Fraser hill it occurs at 4200 ft. on vein-quartz (8897).

Elaeocarpus sp., near *E. apiculatus*, Mast. A small tree differing in small points from this species was collected at Fraser Hill in fruit. (8570). *E. apiculatus* is a tree of low elevations from Penang to Singapore down the west side of the Peninsula.

GERANIACEAE.

Impatiens oncidioides, Ridl., ex Hook. f. in Kew Bull. 1909, p. 11. A herb with beautiful yellow flowers found by water, endemic and montane, occurring along the higher ground of the Main range from G. Kerbau and Telom to G. Menuang Gasing at the head of the Langat valley in Selangor. It occurs at Fraser Hill with clear lemon-yellow flowers (8589) and more rarely with primrose yellow flowers (8943). It does not descend much below. The spur is in the mid-line of the flower.

RUTACEAE.

Evodia pachyphylla, King, Mat., 62, pt. 2, p. 210. An endemic shrub, montane and of very limited distribution in the Peninsula, occurring on the Main range from G. Kerbau, G. Bujong Malaka and Telom down to Fraser Hill where it was found on a vein-quartz ridge and also upon the very summit of Pine-tree hill at 4800 ft. which is west of Fraser Hill in the variety *grandis*. King. It was obtained in flower (8541). The flowers are of a cream colour.

BURSERACEAE.

Canarium rufum, A. W. Benn.: King, Mat., 62, pt. 2, p. 244. An endemic tree common at low elevations in Perak, extending thence southward to Malacca, and found also in the interior of Pahang. Fraser Hill (7831) at 4200 ft. is its uppermost limit as at present observed. It was sterile.

Trigonochlamys? A big tree growing at Fraser Hill, sterile (7802).

MELIACEAE.

Aglaia sp. A tree with hard wood and sparse foliage called by the Malays Tenkohalan, was collected in fruit (8680). It appears to be the species referred to in the Materials (Jour. As. Soc. Beng., 64, p. 65) by Sir George King with his collector's number 4606. The Sakais are said to eat the fruit.

CELASTRACEAE.

Salacia sp. near to *S. latifolia*, Wall. A sprawler found in mine area on the east of Fraser Hill at about 3600 ft., in flower (8600).

AMPELIDACEAE.

Vitis elegans, Kurz, King, Mat., 65, pt. 2, p. 392. A handsome vine endemic except that it extends to Banca, very plentiful about sea-level in the south of the Peninsula, but northwards rare: it has been collected in Malacca, and in Perak (probably Larut); also there exists a specimen carrying a Penang label, but not properly authenticated. It is very common at Fraser Hill (8445) and was both in flower and in fruit, its fruits small black berries.

Vitis furcata, Laws.: King, Mat., 65, pt. 2, p. 399. A rather small vine, in distribution in Sumatra and in the Malay Peninsula, by no means uncommon under the hills down the west side of the Peninsula from Penang to Singapore, in the Taiping hills and down the Main range from the mountains of Telom southwards. It was in flower and in fruit, (1787).

Vitis mollissima, Wall.: King, Mat., 65, pt. 2, p. 402. A common vine with large white berries exceedingly irritant to the throat (whence the Penang Malay name for it of Kesarkitan burong or bird's complaint) found from Burma, the Andamans and the Nicobars, and through the Malay Peninsula: in the Peninsula in the lowlands chiefly. It carried ripe fruit at Fraser Hill (s. n.).

Vitis trifolia, Linn.: King, Mat., 65, pt. 2, p. 688: *Cissus carnosa*, Gagnep.: Koorders, 2, p. 564: *Columella trifolia*, Merr.: Merrill, p. 368. A rather small vine, widely distributed from north-western India to southern China and through Malaysia to New Guinea. In the Peninsula it is not uncommon in the low country; but as regards the hills it has only been collected where roads have been made across the Main range, and its presence is artificial. It is not uncommon in cleared ground at Fraser Hill both with upwardly directed flowers and green fruits in September (8568).

Pterisanthes pulchra, Ridl. in Jour. Str. Br. Roy. As. Soc., 61, p. 2. A small woodland vine, endemic and absolutely local, very common, but very rarely flowering (8924). Mr. Ridley remarks on the difficulty of finding its flowers. He records it as on rocks but it is within our experience under trees that it is to be found; it was got upon vein-quartz and granite soils.

ILICACEAE.

Ilex sp. A bush attaining 10 ft. in height with black 5-celled fruit, growing on vein-quartz (8921).

Ilex sp. A small stiff tree which has been collected on Bukit Etam (Kelsall no. 1845). It was found at Fraser Hill in flower (8693).

ANACARDIACEAE.

Gluta ? A tree attaining 80 ft. in height rather like *G. elegans*, Kurz, but larger-leaved, which the Malays distinguish as Rengas gunung or mountain rengas (8678).

LEGUMINOSAE.

Millettia sericea, W. and A.: Prain, Mat., 66, pt. 2, p. 88: Koorders, 2, p. 382: Merrill, p. 303. A climber, distributed in western Malaysia:—Sumatra, the Malay Peninsula, north Borneo and through all Java, high and low. In the Peninsula it occurs through the low country on the west side from Penang to Singapore, owing some of its spread to the agency of man, and this is particularly the case about Fraser Hill where it occurs on old mined lands, and newly cleared house-sites (8662). The Fraser Hill plants are rather small-leaved, as are also some from Penang.

Desmodium heterophyllum, D. C.: Prain, Mat., 66, pt. 2, p. 135: Koorders, 2, p. 387: Merrill p. 304. A prostrate weed, spread from the Mascarene islands through southeastern Asia, from the wetter Himalaya, and the wetter parts of southern India and Ceylon, southern China, and Malaysia to the Philippines. In the Peninsula it seems not uncommon in the low country, but of its occurrence in the hills there is only evidence that it occurs on G. Kerbau. It was obtained, not abundantly, at about 3500 ft. in the mined lands under Fraser hill over Tras. (1874) whither obviously it has come with the help of man. It occurs in Java both on and under the mountains.

Desmodium laxum, D. C.: Prain, Mat., 66, pt. 2, p. 138: Merrill, p. 304. An upright herb, wide-spread from the eastern Himalaya and China to the Malay Peninsula and to north Borneo. It is uncommon in the Malay Peninsula, and on the Main range has been got only in Ulu Batang Padang and in Telom, and now within a hundred feet of the Gap at the Semangkok pass (8851) i. e. about 3000 ft.

Bauhinia cornifolia, Baker: Prain, King in Jour. As. Soc. Beng., 66, pt. 2, p. 186. A magnificent woody climber, visible by the mass of its flowers at half a mile away, endemic, and montane but closely allied to *B. bidentata*, Jack, with a wider distribution from Sumatra to the Philippines. In the Peninsula it occurs in Penang, on the Taiping hills, on the Main range from G. Bujong Malaka to G. Angsi in Negri-Sembilan, and just under the hills in Selangor; also on Benom in Pahang. It is common at Fraser Hill (8586).

Pithecolobium angulatum, Benth.: Prain, Mat., 66, pt. 2, p. 274: Koorders, 2, p. 356: Merrill, p. 292. A small tree, doubtfully distinct from the Javanese *P. montanum*, Benth., which is there a feature of certain montane forests; in distribution from the Eastern Himalaya through Burma and Siam to Sumatra,

Singapore, Borneo and the Philippines, also in the Andamans and the Nicobars. In the Peninsula it is on the hills of Penang, on the Main range at G. Batu Puteh, and in the south from Kuala Lumpur to Singapore at low levels. At Fraser Hill it appears to owe its place to man, and was found as a small tree not yet at flowering (8663). The Malays call it *Petai belalang*, or grass-hoppers' *Parkia*.

ROSACEAE.

Pygeum ovalifolium, King, Mat., 66, pt. 2, p. 292. A small tree, endemic, and of a very restricted distribution, collected by Sir George King's collector at some unrecorded place in Perak, elevation 5000 ft., and now at Fraser Hill (8505, 8558). There is a gland at the base of the leaf below upon each side of the midrib. The Malays call it *Sepuleh hutan*, or jungle *Fragraea*.

Pygeum Maingayi, Hook. f.: King, Mat., 66, pt. 2, p. 288. A small shrub endemic and montane or submontane, found in upper Perak and down the Main range from Perak to G. Tampin, then in the forests of Malacca and upon G. Pulai in Johore. It was in flower and in fruit at Fraser Hill (7824, 8405). Though a shrub only at Fraser Hill in Negri Sembilan it seems to be a tree; or two species are confused.

Rubus glomeratus Blume: King, Mat., 66, pt. 2, p. 295: Koorders, 2, 324: Merrill, p. 288. A bramble, montane in the north of the Malay Peninsula, and in the south down near sea-level, in British North Borneo and through Java. In the Peninsula, in Penang it is above 1000 ft.; in the Taiping hills it is at and about 4000 ft.: it is at Fraser hill above 4000 ft., both in cleared places and in the direction of Pine-tree hill in a landslip area (8564): it was found also east of the Gap in Semangkok pass, and Machado collected it in 1903 somewhere near the Gap: it is known to occur on Bukit Kutu.

Rubus rosaefolius, Smith: King, Mat., 66, pt. 2, p. 296: Koorders, 2, p. 326: Merrill, p. 288. A small shrub with a pleasant fruit and for that reason encouraged by man throughout its distribution, which is from Kamaon in the north-western Himalaya to Japan, and southwards, in hilly regions, to Borneo and through Java. In the Malay Peninsula it occurs upon the very tops of the hills in Penang, on the Taiping hills from 4000 to 5000 ft., and down the Main range from Telom to Ginting Sempah just north-east of Kuala Lumpur. At Fraser Hill it is very common chiefly in the neighbourhood of the old mines.

SAXIFRAGACEAE.

Weinmannia Blumei, Planch.: King, Mat., 66, pt. 2, p. 299: Koorders, 2, p. 311: Merrill, p. 287. A medium-sized tree extending from Sumatra to (apparently) British North Borneo, and through Java. In the Peninsula it is found on the Taiping Hills

from 4500 to 5000 ft., on G. Tahan and on G. Bubu at 3300 ft., on the Main range about Fraser Hill (8653), on Benom and on Mt. Ophir. It is called Kasai bukit (hill Pongamia) by the Malays, and is by no means uncommon.

HAMAMELIDACEAE.

Bucklandia populnea, R. Br.: King, Mat., 66, pt. 2, p. 308. A tree of considerable size found from the Central Himalaya down in hilly regions to Sumatra and Java: in the Malay Peninsula, collected on G. Inas at 5000 ft. in Perak, and on the Main range in Ulu Batang Padang at 3900 ft., on G. Tahan, and on Benom. Under Fraser Hill (8855) it occurs commonly as an immature tree in mined lands from 3300 to 3700 ft. in the Upper Tras valley. As it reaches 6000 ft. in the Khasia hills, 3300 ft. is a relatively low elevation.

MYRTACEAE.

Tristania Maingayi, Duthie: King, Mat., 70, pt. 2, p. 72. An endemic tree but only uncertainly distinct from *T. merguensis*, Griff., which as its name implies occurs in Tenasserim (as well as in the Peninsula) and extends to Borneo. *T. Maingayi* is found on the hills of Penang and on Kedah peak and was obtained as an 80-foot-high tree at 4000 ft. in Fraser Hill (7752) with flowers.

Rhodamnia cinerea, Jack: Merrill, p. 423; *R. trinervia*, Blume: King, Mat., 70, pt. 2, p. 74; Koorders, 2, p. 673. A small tree distributed from Tenasserim southwards through western Malaysia (unless it fail in east Java), to the Philippines and to north Australia: in the Peninsula it is very common at low levels, but in the higher hills possibly is rare. At Fraser Hill it occurred as a small tree with leaves of less than the usual size, at 4,100 ft. (7832).

Rhodamnia uniflora, Burkill: *R. trinervia*, var., *uniflora* Ridl., in Jour. F.M.S. Mus., 4, p. 146; *R. trinervia*, Ridl. in Jour. F.M.S. Mus., 2, p. 114. A montane endemic tree, occurring on G. Tahan, and at Fraser Hill, where it is common upon ridges of vein-quartz (8656, 8941), and attains a height of 60 ft. The young leaves are yellow below, the fruit a dull purple. On the breadth of the leaves and upon their colour below the species is to be distinguished, and not as the name suggests upon the fewness of the flowers from the nodes, for some varieties of *R. cinerea* exist wherein the flowers may be very few. The G. Tahan specimens seen are Wray's and Robinson's No. 5500 from between 5000 and 6000 ft., and Ridley's Nos. 16024 and 16272 from "Wray's camp." It is said also to be on Mt. Ophir, and G. Kerbau: but specimens have not been seen.

Eugenia corrugata, King, Mat., 70, pt. 2, p. 93. A small tree with dark foliage and hard wood, occurring at Fraser Hill

(8803), endemic within the Peninsula. The locality whence the type came in not exactly recorded but was probably on or under the Main range.

No. 7843 from Fraser Hill is an *Eugenia* which also may perhaps be this species.

Eugenia zeylanica, Wight: King, Mat., 70, pt. 2, p. 108: Merrill, 434. A tree of fifty feet with a rather small broken head, in distribution in southern India and Ceylon in the Andamans, in Sumatra, the Malay Peninsula and Borneo. In the Peninsula it occurs in Lower Siam at least from Takuapa, and southwards down both sides to Singapore. It was in flower at Fraser Hill (8677). The Fraser Hill specimens have smaller leaves than is usual at lower elevations.

Eugenia valdevenosa, Duthie: King, Mat., 70, pt. 2, p. 111. A small tree, endemic, occurring in Penang, the Taiping hills, and on the Main range from above Gopeng down into northern Negri Sembilan. It was obtained in fruit (7811, 8829), as a tree 25 ft. high.

***Eugenia* sp.**, apparently endemic, and an undescribed species. A tree occurring at Fraser Hill in flower (7751). It has curiously crested branches, which suggest, but differ considerably from, those of *E. setosa*, King.

Eugenia microcalyx, Duthie: King, Mat., 70, pt. 2, p. 124. A medium sized tree, endemic, distributed down the west coast of the Peninsula from Penang to Singapore and in the hills above Gopeng, in Ulu Bubong and about the Semangkok pass. It was in flower at Fraser Hill (7796).

***Eugenia* sp.**, near *E. valdevenosa*, Duthie; but with more coriaceous and smaller (12 x 6 cm.) leaves, was got on Pine-tree hill at 4,800 ft. (8535).

Eugenia oreophila, Ridl. in Jour. Str. Br. Roy. As. Soc., 61, p. 9. A shrub very closely allied to *E. jugalis*, Ridl., endemic and local, described from specimens collected in Ulu Semangkok by Mr. F. Dennys in 1907 as Kelat bukit or hill *Eugenia*; found by us in flower at Fraser Hill (8899) and at the Trigonometrical station immediately over the Gap upon the east side of the Semangkok pass (8870).

***Eugenia* n. sp.**, with obovate coriaceous leaves, 8 x 4 cm. the veins most obscure, was got in flower (8685) at 4,300 ft.

***Eugenia* sp.**, apparently near *E. corrugata*, King, with leaves about 14 x 7 cm. drying brown, and with flowers about 1.5 cm. across, was got in the valley of Fraser Hill (7777).

***Eugenia* sp.** A tree with red bark, sterile, here and there about Fraser Hill (7806).

Barringtonia Scortechinii, King, Mat., 70, pt. 2, p. 138. A tree of second rank, endemic and montane or submontane except

that it has been collected at Temerloh in Pahang, found in Penang, in the Taiping hills and on G. Bubu, in the Main range from Fraser Hill (8691) to G. Berumban in Negri-Sembilan, reaching the foot of Bukit Kutu. It carried deep crimson flowers on the end of branches, hanging into the light-diffusion space of rather dense one-hundred-feet high forest.

MELASTOMACEAE.

Melastoma malabathricum, Linn.: King. Mat., 69, pt. 2, p. 6: Koorders, 2, p. 690. A shrub of wide distribution, occurring from the Seychelle islands, through the parts of India which are damp enough, into China, and through Malaysia to northern Australia and to New Caledonia. In the Peninsula it is general, and owes its abundance largely to man; but not its presence, for it can hold its own in light forest: and it reaches 5,000 ft. on G. Tahan. It is plentiful at Fraser Hill (8574) in the variety *perakense*.

Blastus Cogniauxii, Stapf: King, Mat., 69, pt. 2, p. 13: Merrill, p. 438. A weak shrub of shade with small inconspicuous flowers, distributed down the Malay Peninsula and in northern Borneo. In the Malay Peninsula it occurs in the Taiping Hills, in Upper Perak, on G. Tahan, on the Main range from Bujong Malaka and the Telom hills to Ginting Bidai east of Kuala Lumpur, on G. Taneng and G. Pantai in Johore, and again in low country about Kuala Lipis and in the south of Johore. It is frequent at Fraser Hill (8613).

Anerincleistus floribundus, King, Mat., 69, pt. 2, p. 17. A shrub 20 ft. high, endemic, and until found between Fraser Hill and the Gap, Semangkok pass, at about 3,200 ft., and west of Fraser hill on the track to Pine Tree hill at 4,300 ft. known only from the Taiping hills and on G. Bubu. Its terminal panicle of pink flowers with exposed yellow stamens is very conspicuous (8509).

Anerincleistus grandiflorus, Ridl. in Jour. Str. Br. Roy. As. Soc., 47, p. 45. A endemic and montane shrub, of limited distribution along the Main range from Fraser Hill to G. Mengkuang, Ibar. Curtis obtained it in the neighbourhood of the Semangkok pass at 2,000-3,000 ft. in May 1902: Mr. Ridley in flower in April 1911; the Hon'ble Mr. G. Hose collected it at Fraser Hill in flower in August 1919 and we found it at 4,200 ft. on one of the vein-quartz ridges of Fraser Hill (8939) flowering in September, 1922, but not freely. The specimens from the mountains further south are labelled 5,000 ft. and 5,400 ft. It carried flowers, with white petals and a pink calyx as well as ripe fruit.

Sorerila tenuifolia, Blume: Stapf and King, Mat., 69, pt. 2, p. 24: Koorders, 2, p. 692: Merrill, p. 442. A herb distributed through the wetter parts of western Malaysia, occurring in Sumatra, in western Java, in northern Borneo, and in the Malay Peninsula montane on G. Bubu, on G. Tahan, on the Main chain from G.

Kerbau and the mountains of Telom to Bukit Etam at altitudes of 4,000 to 5,300 ft., and on Mt. Ophir. It was not seen at Fraser Hill, but at Pine tree hill, at 4,800 ft., where it is common (8542).

Sonerila rudis, Stapf and King, Mat., 69, pt. 2, p. 27. A herb growing in moss in forests, endemic, and montane from 3,000 ft. upwards over a restricted area of the Main range, from G. Kerbau, G. Bujong Malaka and G. Batu Puteh south to the Semangkok pass: very common at Fraser Hill both in flower and in fruit (8414, 8624). It propagates itself by runners to a considerable extent.

Sonerila albiflora, Stapf and King, Mat., 69, pt. 2, p. 28. A herb of the forest floor, endemic, and montane, occurring on the main range at 3,500 ft. and above, from G. Bujong Malaka to the Semangkok pass, and also on G. Kledang over Ipoh at only 1,000 ft. above sea-level. It was found between Fraser Hill and Pine-tree hill (8508) in flower and with ripe fruit. The flowers are pale pink, as well as white. The Hon'ble Mr. G. Hose who collected it below Fraser hill in 1919, obtained it at 3,800 ft.

Sonerila integrifolia, Stapf and King, Mat., 69, pt. 2, p. 34. An upright herb of shade, endemic, and montane or submontane, found on the Taiping hills, and under them on the west side: on G. Bubu, on the Main range from Fraser Hill to Ginting Sempah north-east of Kuala Lumpur and under the Main range on the west side. It is very common at Fraser Hill (8540, 8602, 8641) both in flower and in fruit, and was got also above the Gap on the ascent towards G. Ulu Semangkok at 3000 ft. (8886).

Sonerila velutina, Ridl. in Jour. F. M. S. Mus., 4, p. 18. A herb, of a somewhat more upright habit and of a darker chestnut colour than the common *S. rudis*, endemic, and as far as known confined to the Main range between G. Kerbau, the mountains of Telom and the Semangkok pass occurring from 4500 ft. upwards. It was found at Pine-tree hill at 4800 ft. (8645), and on G. Ulu Semangkok which is south-east of the Semangkok pass.

Phyllagathis hispida, King Mat., 69, pt. 2, p. 46. A herb, endemic in the mountain-forests of the Peninsula, found on the Taiping hills, in upper Perak, on G. Tahan, and down the Main range from Ulu Batang Padang and the mountains of Telom to the Semangkok pass. It is very common at Fraser Hill and was in new flower (8623).

Marumia nemorosa, Blume: King, Mat., 69, pt. 2, p. 47: Merrill in Jour. Str. Br. Roy. As. Soc p. 444. A woody sprawler, about 20 ft. long, occurring in the interior of western Malaysia, i.e. in Sumatra the Malay Peninsula and in Borneo. In the Peninsula it is found in the low country from Penang and Trengganu southwards to the Johore straits: it ascends the Taiping hills to 3500 ft., on Fraser Hill to above 4000 ft. (7791, 8647) and Bukit Kutu. It was found in flower and with half ripe fruit and is frequent. The rose-magenta flowers fall in the afternoon.

Dissochaeta pallida, Blume: King, Mat., 69, pt. 2, p. 52. A endemic woody sprawler extending from Tomah in lower Siam (lat. 6° N.) down to Singapore, ascending the mountains as in Penang, in the Taiping hills to 4500 ft., and on the Main range to about 4000 ft. It carried flowers and fruits at Fraser Hill, (8553, 8646).

Dissochaeta annulata, Hook. f.: King, Mat., 69, pt. 2, p. 50: Merrill, p. 445. A woody sprawler, occurring down the Peninsula and in northern Borneo. In the north of the Peninsula it is montane occurring on Western Hill in Penang, on the Taiping hills, at Fraser Hill (8628) in the Main range, on Mt. Ophir, on G. Pantai in Johore, and lastly in Singapore island within 500 ft. of sea-level.

Anplectrum pallens, Blume: King, Mat., 69, pt. 2, p. 57: Merrill, p. 443. A sprawler, distributed in the interior of western Malaysia from Sumatra to northern Borneo: within the Peninsula occurring as a submontane or montane plant, in Penang on Western Hill, on the Taiping hills from 2000 ft. downwards, on the Main range from the Semangkok pass to the neighbourhood of Kuala Lumpur, and under this range as well as extending southwards to Singapore. It was not observed at Fraser Hill itself, but was obtained at the Trigonometrical station immediately over the Gap of Semangkok pass on the east side at 3800 ft. (8872), in fruit.

Medirilla venusta, King, Mat., 69, pt. 2, p. 61. A shrub, endemic and possibly confined to the Main range; but the origin of the specimens which Sir George King used when writing his description is not recorded more nearly than "Perak." It is common as an epiphyte at Fraser Hill, and is a very beautiful plant (8430, 8554).

Medirilla crassinervia, Blume: King, Mat., 69, pt. 2, p. 64: Merrill, p. 447. A beautiful bush with large cherry-red fruits, extending from the Malay Peninsula eastwards to Borneo and on to Ternate, Banda and New Guinea. Within the Peninsula it is montane in the north, but descends to low levels in Singapore and Johore: in the north it occurs in Penang, on G. Tahan, and on the Main range from Ulu Batang Padang to Gua Batu or Batu Caves near Kuala Lumpur. It was found under Fraser Hill in the upper Tras valley in a mined area upon the tops of boulders, at 3600 ft. (7866).

Medirilla Clarkei, King, Mat., 69, pt. 2, p. 63. A beautiful bush with white flowers and white berries, endemic and montane within the Peninsula, found on Gunong Tahan at 3300 ft., on the Main range from G. Kerbau to G. Menkuang lebar, on Benom and again on the top of Mt. Ophir. It is not uncommon at Fraser Hill (8557), where also the Hon'ble Mr. G. Hose obtained it in August 1919.

Medirilla heterantha, King, Mat., 69, pt. 2, p. 61. Specimens with seven equal anthers (s.n.), but otherwise appearing to

be *M. heterantha* were obtained just under Fraser Hill in the upper Tras valley at about 3500 ft. *M. heterantha* is an endemic and montane species of the Peninsula which is recorded as occurring on the Taiping hills, and on the Main range on G. Batu Puteh.

Memecylon dichotomum, C. B. Cl.: King, Mat., 69, pt. 2, p. 75. A small tree, endemic, submontane found on Kedah peak, on the Taiping hills, on G. Bubu, on G. Tahan, down the Main range in Perak and Selangor; and at Gemas on the Johore-Negri-Sembilan boundary. It occurs at Fraser Hill as a small tree about 30 ft. high under other trees (8697). It is called Nipis kulit or "thin-bark," like several other small trees.

Memecylon heteropleurum, Blume: King, Mat., 69, pt. 2, p. 78; Merrill, p. 453. A shrub with beautiful pinkish-blue flowers and purple fruits; which contain a pink-fleshed seed: distributed in the interior of western Malaysia, *i.e.* in Sumatra, in the Peninsula and in Borneo. In the Peninsula it occurs from Penang down the western side to Singapore. It occurred as an epiphyte at Fraser Hill (7869) and has been collected on G. Tahan. Our specimens have a venation in the leaf closer than usual, but not closer than *Curtis 814*, from Penang which is admitted as this.

Memecylon myrsinoides, Blume: King, Mat., 69, pt. 2, p. 81; Koorders, 2, p. 702; Merrill, p. 454. A shrub, distributed through western Malaysia, Sumatra, the Peninsula, Banca, Java, Borneo and beyond in Celebes. In the Peninsula it is in the low country from Lankawi to Singapore; and the Fraser Hill locality is of a surprising elevation. It grew as a shrub 15 ft. high upon one of the vein-quartz ridges (8937) and was in flower. Is it really absent from western Java as Koorders implies?

Memecylon laevigatum, Blume: King, Mat., 69, pt. 2, p. 82; Merrill, p. 454. A shrub, in distribution from Tenasserim, the Andamans and Nicobars, through Sumatra, and the Peninsula to Banca, Java and Borneo. In the Peninsula it is found in the lowlands down both sides. It was not found at Fraser Hill, but at the Trigonometrical station immediately over the Gap. Semangkok pass, on the east side at 3800 ft. (8888), in fruit; and in want of flowers the determination is slightly doubtful.

LYTHRACEAE.

Duabanga sonneratioides, Ham.: King, Mat., 67, pt. 2, p. 10. A tall tree distributed from the central Himalaya in hilly regions through Burma and Siam, to the Andamans and Nicobars, and to the Malay Peninsula, where it seems to reach its limit on the eastern slopes of the Main range not far from Kuala Lumpur. On the east side of Fraser Hill from about 3300 ft. (7867) downward: almost if not quite to the foot of the range it occurs in groups by streams: it is present also on the west side, but is rare. It exists in Penang, on the Taiping hills and is common in the

valley of the Perak river near Kuala Kangsar and again about the mountains of Telom at 4000 ft. The Malays who eat the acid young fruit call it *berembang bukit*.

ONAGRACEAE.

Jussieua fissendrocarpa, Haines, in Jour. As. Soc. Beng. N. S. 15. p. 313. A marsh-herb distributed from north-eastern India southwards at least to Singapore and possibly to the Philippines, and occurring down the Peninsula here and there in the lowlands. At Fraser Hill it was found in the vegetable garden under Fraser's bungalow (7850).

SAMYDACEAE.

Casearia esculenta, Roxb.: King. Mat., 67, pt. 2. p. 17. A shrub or small tree, distributed in southern India and Ceylon, and then from Tenasserim southwards to Sumatra and Singapore mostly in the low country, but also in the hills, as on Kedah peak, on the hills of Penang, and down the Main range from G. Kerbau and the mountains of Telom to G. Angsi. It is recorded as at 7300 ft. on Korinchi peak in Sumatra. It was found with rather small leaves in fruit on G. Ulu Semangkok, which is south-east of the Semangkok pass (8880).

CUCURBITACEAE.

Trichosanthes bracteata, Voigt: Koorders, 3, p. 297: Merrill, p. 584: *T. palmata*, Roxb.: King. Mat., 67, pt. 2, p. 29. A herbaceous climber distributed from the Himalaya to Ceylon and in Japan, as well as in China, thence southwards through Sumatra, the Peninsula, Borneo, Java, Celebes, Timor to northern Australia: in the Peninsula not well collected and its presence is not attested for the south. At Fraser Hill it owes its abundance to the interference of man, and its stems extend over the exposed earth of the new roadsides, carrying globose green fruits in abundance (8562).

BEGONIACEAE.

Begonia tricornis, Ridl. in Jour. Str. Br. Roy. As. Soc., 75, p. 35. A herb of forest, endemic and montane, restricted to the Main range from the mountains of Telom to Ginting Bidai, east of Kuala Lumpur. At Fraser Hill it is not uncommon; it was found in fruit (8669) sparingly.

Begonia sp., not uncommon at Fraser Hill (8428) in flower growing in shade, half-prestrate and rooting at the nodes. The flowers are light pink, and the leaves are relatively broader than those of *B. tricornis*.

UMBELLIFERAE.

Eryngium foetidum, Linn.: King. Mat., 61, p. 71: Koorders, 2, p. 724. This American plant which is slowly spreading westward in Asia, is quite common at Fraser Hill round the old

mines, and down the valley towards Tras: so long as the forest is not allowed to close in, it will persist. Machado collected it near the Gap in 1903.

ARALIACEAE.

Heptapleurum, sp. A tree forty feet high, with dark claret flowers (8946), apparently a new species, found at 4000 ft.

Heptapleurum sp. A shrub 6 ft. high, with a prickly stem, is not uncommon at Fraser Hill (7882) and in the upper Tras valley (s.n.), allied to *H. ellipticum*. Seem., but differing in the inconspicuousness of the veins of the leaf.

Arthrophyllum diversifolium, Blume: King, Mat., 67, pt. 2, p. 59: Koorders, 2, p. 717: Merrill, p. 458. A small tree, distributed through western Malaysia and in the Andamans; in the Peninsula common all down the west side, whereas on the east side it has been collected only upon P. Tioman; but it is assuredly present. It was found in forest at Fraser Hill (7834) at 4200 ft.,— an upward extension of its recorded altitudes, in flower.

Arthrophyllum montanum, Ridl. in Jour. F. M. S. Mus. 4, p. 24. A shrub, endemic, confined to the Main range from the mountains of Telom to the Semangkok pass. It was found on veinquartz ridges at Fraser Hill in flower (8926), being three feet high only.

Arthrophyllum pinnatum, C. B. Clarke in part: King, Mat., 67, pt. 2, p. 59 in part. A small shrub, endemic apparently, occurring on the top of the hills in Penang, and on the Main range from G. Batu puteh to G. Mengkuang lebar. It was found on G. Ulu Semangkok at 3000 ft. (8865). The Mount Ophir plant differs.

CAPRIFOLIACEAE.

Viburnum sambucinum, Reinw.: King & Gamble, Mat., 72 pt. 2, p. 113: Koorders, 3, p. 285: Merrill, p. 512. A bush, spread through western Malaysia, in Sumatra, the Peninsula, Borneo and throughout Java, from about 1000 ft. to 5000 ft. In the Peninsula it is montane as regards the north, but descends to sea-level in Singapore: it occurs upon the summit of Government Hill, Penang, on the Taiping hills, and down the Main range from the mountains of Telom to G. Menkuang lebar. Often it owes its position to man in chief part, and this is the case at Fraser Hill, where it occurs about the old mines (7779). It was newly in flower.

Viburnum Beccarii, Gamble, Mat., 72, pt. 2, p. 114. A bush occurring in Sumatra and in the Malay Peninsula, montane. In the Peninsula it was first collected by Scortechini in Perak, probably in the mountains at some little distance to the north of Fraser Hill. It occurs at Fraser Hill (8631) and was in flower. It has been determined from descriptions only.

RUBIACEAE.

Uncaria dasyoneura, Korth.: King & Gamble, Mat., 72, pt. 2, p. 136. A woody climber, distributed in Ceylon, and then disjointedly in Sumatra and the Malay Peninsula. In the Peninsula it is montane: it occurs in Penang, and is on the Main range in Perak where Sir George King's collector got it: at Fraser Hill it is very abundant and in Malacca, probably on Mt. Ophir. It is also said that Lobb got it in Singapore; but then Lobb's plants are not accurately labelled in all cases. At Fraser Hill where it goes to the tops of fairly large trees, it was in flower and new foliage and with enormous quantities of fruit (8409): it was also on G. Ulu Semangkok. Haviland distinguished the Ceylon plants varietyally (Jour. Linn. Soc. Bot., 33, p. 82.)

Argostemma Yappii, King in King & Gamble, Mat., 72, pt. 2, p. 145. A half-epiphytic herb, endemic and of narrow distribution on the mountains, on G. Tahan above 5000 ft., and on the Main range from the mountains of Telom to G. Mengkuang lebar. It occurs at Fraser Hill (8573) at 4200 ft. and thence upwards to 4800 ft. in Pine tree hill (8527): and it occurs on G. Ulu Semangkok which is south-east of the Gap. It climbs the lowest one or two feet of tree trunks and has a very fleshy stem.

Argostemma urticaefolium, King: King & Gamble, Mat., 72, pt. 2, p. 146. A herb, perhaps occurring in Sumatra, and found upon the Main range of the Peninsula from the Telom mountains to Bukit Etam. It flowers about the Semangkok pass in May (Curtis 3748); and only in one spot were flowers found in September (8857).

Argostemma spinulosum, C. B. Clarke: King & Gamble, Mat., 72, pt. 2, p. 149. A herb, endemic, and montane, occurring on the Taiping hills, on the Main range from G. Batu puteh to Bukit Etam, and in Johore on G. Pantai. It is rare at Fraser Hill (8622).

Argostemma involucreatum, Hemsl.: King & Gamble, Mat., 72, pt. 2, p. 151. An endemic herb with beautiful white flowers montane, occurring on the Taiping hills, on G. Tahan, on the Main range from G. Kerbau, Bujong Malaka and the Telom mountains to the neighbourhood of Kuala Lumpur, on Benom, and on Mt. Ophir. At Fraser Hill it is perhaps the commonest herb in the forest and in September its flowers, turned downwards obliquely with a conspicuous large green nectary, were everywhere (8412); but towards Pine-tree hill it disappeared.

Ophiorrhiza erubescens, Wall.: King & Gamble, Mat., 72, pt. 2, p. 172. A small forest herb, occurring in Upper Burma and down the Malay Peninsula as far as Bukit Sedanan in Malacca. It is montane or submontane, but has been collected at 6500 ft. on Ridley's G. Berumban. It was found in fruit at Fraser Hill (8594) and on G. Ulu Semangkok (8887).

Mussaenda mutabilis, Hook. f.: King and Gamble, Mat., 72, pt. 2, p. 182. A woody sprawler, endemic, rather submontane than montane, distributed from (perhaps) Penang and Bundi south-wards to Singapore, occurring on the Taiping hills, on the Main range and on Mt. Ophir to 2000 ft. at least. It was found under Fraser Hill at about 3800 ft., exposing its brilliant scarlet flowers at a height of about 20 ft. from the ground in a place where a fallen tree had let light into the forest (7759).

Mussaenda villosa, Wall.: King & Gamble, Mat., 72, pt. 2, p. 183. A woody sprawler, distributed in Sumatra and in the Peninsula southwards to Malacca and Mt. Ophir: it occurs at low elevations, and the Fraser Hill plant (s.n.) appears to be varietally distinct from the lowland plant. It was found just above 4000 ft. The Mt. Ophir plant also differs.

Lucinaea Ridleyi, King in King & Gamble, Mat., 72, pt. 2, p. 178: Merrill, p. 558. A woody sprawler occurring in the hilly parts of the north of the Malay Peninsula and in north Borneo. In the Peninsula it has been got in the Taiping hills, and on the Main range in the Batu Padang valley and at Fraser Hill at 4300 ft. in flower (8681). Lobb collected specimens which exist in herbaria with the label "Singapore" upon them: but Lobb's labels are not always accurate.

Urophyllum glabrum, Wall.: King & Gamble, Mat., 72, pt. 2, p. 198: Merrill, p. 539: *U. arboreum*, Korth.: Koorders, 3, p. 255. A small tree distributed in western Malaya from Sumatra, through the Peninsula, in western Java, in Banca, Borneo, and to the Philippines. It is one of the species which in the Peninsula occur at sea-level in the south: but are rare or absent in the lowlands in the north, however it is on P. Nipis, an islet off the Lower Siam coast near P. Adang,—but not in the usual form. It has been collected upon the Main range north of Fraser Hill: and is plentiful at Fraser Hill (8668, 8688) as a small tree 25 ft. high, in flower and in fruit. The Malays call it Tabosah.

Stylocoryna fragrans, Blume: King & Gamble, Mat., 72, pt. 2, p. 201: *Tarennia fragrans*, Merrill, p. 561. A shrub, distributed in Sumatra, down the Peninsula from Champawn in Lower Siam to Singapore upon both sides, and in Borneo. This is the first record of its occurrence in the higher hills. It was found at Fraser Hill at 4200 ft. (8686, 8882), and on G. Ulu Semangkok, in flower.

Webera salicira, Ridl. in Jour. F. M. S. Mus., 4, p. 34. A shrub, endemic and confined as far as is at present known, to the Main range from the mountains of Telom to Fraser Hill where it was got in the direction of Pine-tree hill (8513).

Randia racemosa, Cav.: Merrill, p. 563. *Randia densiflora*, Benth.: King & Gamble, Mat., 72, pt. 2, p. 208: *R. oppositifolia*, Koord.: Koorders, 3, p. 297: A shrub, widely distributed from north-eastern India and southern China down the hilly regions of

Burma, in the Andamans and Nicobars, through Malaysia to north Australia: in the Peninsula it is a wide-spread lowland plant of the west side to Malacca: but it has not been collected as yet on the east side north of P. Tinggi. Upon the Main range it is certainly on G. Haram and on Bukit Kutu. It was collected at Fraser Hill (8442) carrying its fragrant white flowers.

Randia anisophylla, Jack: King & Gamble, Mat., 72, pt. 2, p. 209. A small tree or large shrub, in Sumatra and distributed freely down the west coast of the Peninsula from Penang to Singapore, unless rare in Perak, but as yet quite unrecorded for the east coast. It is not uncommon at Fraser Hill attaining 30 ft. in forest under tall trees, in flower (8446), and in fruit (8660). The Malays call it Kayu laha.

Randia sp. A shrub unfortunately flowerless (8664), with two pairs of curved thorns at the base of each lower side branch for climbing, the lower pair of which two are brought against the parent axis by the angle at which the side branch stands.— a very perfect grapple arrangement.

Gardenia pulchella, Ridl. in Jour. F. M. S. Museums 4, p. 31. A fat stemmed small shrub with the flowers close to the ground, occurring in the mountains of Telom and it was found at Fraser Hill in immature fruit (8593).

Timonius diffusus, Ridl. in Jour. F. M. S. Mus. 4, p. 32. A small tree, endemic and montane, found on G. Tahan, and on the Main range in the mountains of Telom, where very common, and now at Fraser Hill (7801), in flower and in fruit, attaining 20 ft.

Timonius sp. near *T. montanus*, Ridl., a small tree found at Fraser Hill, with foliage 8 x 2 cm. and fruits 8 mm. long (8561). *T. montanus* occurs on G. Tahan.

Timonius n. sp. A small tree 10 feet high found on the vein-quartz ridges of Fraser Hill (8922 and s.n.) with a more or less fastigiate habit, carrying orange flowers, its leaves 8 x 3 cm., its ribbed fruits 12 mm. long.

Ixora Lobbii, Loudon: King & Gamble, Mat., 73, pt. 2, p. 78. A shrub, distributed through the Peninsula: it is very common in the lowlands from Khasum in Lower Siam (Lat. 8° 20' N.) to Singapore; it is but little recorded from the hills, as Penang, the Taiping hills, the Main range at G. Batu Puteh and G. Pantai in Johore. At Fraser Hill it was observed sporadic in the forest carrying its reddish salmon flowers (8607).

Gynochthodes sub lanceolata, Miq.: King & Gamble, Mat., 73, pt. 2, p. 92: Merrill, p. 580. A woody climber, distributed in the interior of western Malaysia, from Sumatra through the Malay Peninsula to north Borneo: in the Peninsula down the west side from Penang to Singapore, and now obtained from the Main range

at Fraser Hill, where it is plentiful (8571, 8936 and s.n.), both in flower and in fruit; it occurred on vein-quartz ridges.

Psychotria viridiflora, Reinw.: King and Gamble, Mat., 73, pt. 2, p. 15: Koorders 3, p. 266: Merrill, p. 575. A half-woody plant spread through the whole of western Malaysia, i.e., Sumatra, the Malay Peninsula, the whole of Java and Borneo: in the Peninsula from Koh Pennan and Trang in Lower Siam (Lat. $7^{\circ} 30' N.$) southwards to Malacca, where it appears to be more common than elsewhere. It occurs at about 4000 ft. on the Taiping hills, and is in the mountains of Telom. It was got in fruit at Fraser Hill (8674), and ascends to 5000 ft. in Java.

Psychotria sarmentosa, Blume: King and Gamble, Mat., 73, pt. 2, p. 5: Koorders, 3, p. 265: Merrill, p. 573. A rather small woody climber, widely distributed, being in southern India and Ceylon, where it ascends to 4000 ft., in Burma, and in the Andamans, down the Peninsula, through Java and through Borneo. In Java it ascends to 6700 ft. It occurs at Fraser Hill on vein-quartz (8935). There is rather too much variability between the specimens put under this species for it to be considered as satisfactorily defined.

Chasalia rostrata, Miq.: King and Gamble, Mat., 72, pt. 2, p. 134: Koorders, 3, p. 268. A bush, distributed down the Peninsula not uncommonly from Larut to Singapore, and in west Java. It has been gathered before this on the lower slopes of the mountains of the Peninsula, e.g. the Main range in all three states, Perak, Selangor and the Negri-Sembilan, as well as on the lower slopes of Mt. Ophir but never before as high as Fraser Hill (7818, 8603). The Fraser Hill plants have hirsute pedicels.

Chasalia lurida, Miq.: Merrill, p. 576: *C. curviflora*, Thwaites; King and Gamble, Mat., 72, pt. 2, p. 133: Koorders, 3, p. 268. A weak shrub of wide distribution, and apparently breaking up into subspecies, found in Ceylon and southern India, in north-eastern India, and down through Burma into Sumatra and Malaysia to the Philippines: in the Peninsula it occurs everywhere through the lowlands: it ascends Kedah peak, the Taiping hills and the mountains of Telom, but no altitudes are recorded, except 3,000 ft. for Kedah peak. It was found here and there in the forest about Fraser Hill carrying flowers as well as its black fruits (8526, 8534, 8582) and ascended to Pine tree hill at 4,800 ft. It attains almost 5,000 ft. in Java.

***Chasalia* sp.** This plant appears to be new and endemic within the Peninsula. It was collected near the Semangkok pass by Mr. Curtis in 1902, and by ourselves as a small tree 25 ft. high, with white flowers (8591).

***Cephaelis* sp.**, a one-stemmed woody plant, which is rather more slender than the next is common also at Fraser Hill (7810, 8627) where it grows in the forest in the same way. It also has been collected by Mr. Ridley (his No. 12073).

Cephaelis sp. A one-stemmed woody plant growing in shade and carrying its flowers horizontally, perhaps close to *C. Griffithii*, Hook f., is common at Fraser Hill (8435) where it was collected in 1911 by Mr. Ridley (his No. 15667), and occur also on G. Ulu Semangkok equally commonly.

Lasianthus rhinocerotis, Blume: King and Gamble, Mat., 72, pt. 2, p. 114: Koorders, 3, p. 271. A shrub, montane, occurring in Sumatra in the Malay Peninsula and on the mountains of west Java: in the Peninsula in the Taiping hills, on the Main range from the mountains of Telom and G. Batu puteh to Ginting Peras which is between the States of Selangor and Negri-Sembilan. It is not uncommon at Fraser Hill, in flower (8520, 8605).

Lasianthus longifolius, Wight: King and Gamble, Mat., 72, pt. 2, p. 116. A small tree with a most objectionable smell, endemic and submontane, on "G. Tunggul" in Perak, and on the Main range southwards from Fraser Hill, to Kuala Lumpur, and recorded for "Malacca" probably meaning Mt. Ophir. At Fraser Hill it attains 15 ft. in height and is by no means uncommon in flower and with purplish red fruit (8519) also it is on G. Ulu Semangkok (8875). It may be called Kahawa utan or jungle coffee by the Malays. Specimens collected under no (8604) at Fraser Hill may also represent the same species.

Lasianthus oblongus, King and Gamble, Mat., 72, pt. 2, p. 127. A shrub, endemic occurring on Kedah peak, on the Taiping hills, and on the Main range from Fraser Hill to the neighbourhood of Kuala Lumpur where it descends to low levels. It was found in the mine area of the upper Tras valley under Fraser Hill at about 3,500 ft. (7865).

Paederia verticillata, Blume: King and Gamble, Mat., 72, pt. 2, p. 97: Koorders, 3, p. 276: Merrill, p. 580. A woody climber, distributed in Malaysia, from the Peninsula through north Borneo to the Philippines and also in the mountains of west Java. In the Peninsula it occurs at low levels down the west side from Kedah to Singapore and on the east side is in Trengganu. This is its first record for the mountains of the Peninsula: it was found at about 3,600 ft. under Fraser Hill in the upper part of the valley of the Tras stream (7863) in fruit.

Spermacoce ocymoides, Burm., Hook. f., Fl. Brit. Ind., 3, p. 200: *Borreria ocimoides*, D.C.: Koorders, 3, p. 281. A small herb, a weed very wide through the Tropics, but not yet universal in the Malay Peninsula. It has reached the Gap, but has not ascended to Fraser Hill.

COMPOSITAE,

Adenostemma Lavenia, O. Kze.: Merrill, p. 587: *A. viscosum*, Forst.: King and Gamble, Mat., 74, pt. 2, p. 28: Koorders, 3, p. 316. A pantropic herbaceous weed, following man, not yet

abundant in the Malay Peninsula, but probably increasingly spreading. At Fraser Hill it occurs about the mines, and particularly in the old workings of the upper Tras valley (s.n.)

Ageratum conyzoides, Linn.: King and Gamble, Mat., 74, pt. 2, p. 29: Koorders, 3, p. 317: Merrill, p. 587. A pantropic herbaceous weed, very common in the Peninsula but except for a specimen from Bukit Kutu and another got in a Sakai clearing in Telom unrecorded for the hills. It occurs at Fraser Hill up to 4,100 ft.,

Erigeron linifolius, Willd.: King and Gamble, Mat., 74, pt. 2, p. 872: Koorders, 3, p. 322: Merrill, p. 587. A herbaceous weed, more or less pantropic, scattered through the Malay Peninsula, but hitherto there have been no records of its occurrence in the mountains. It occurs in the mined area both at Fraser Hill and in the upper Tras valley below, in flower and fruit (s.n.).

Vernonia arborea, Buch.-Ham.: King & Gamble, Mat., 74, pt. 2, p. 26: Koorders, 3, p. 314: Merrill, p. 586. A tree distributed in southern India and Ceylon where it ascends to 5000 ft., in north-eastern India, not including the Himalaya, thence southwards through Burma into Sumatra and down through western Malaysia, on to Celebes and in north-eastern Malaysia in the Philippines. It ascends to 6500 ft. in Java. In the Peninsula it occurs through the lowlands, and the only specimens which have been seen from its mountains are those from Fraser Hill (7846), and some collected by Mr. Ridley. It was seen as a tree 25 ft. high in fruit.

Blumea balsamifera, D. C.: King & Gamble, Mat., 74, pt. 2, p. 33: Koorders, 3, p. 324: Merrill, p. 587. A big almost woody herb, distributed from the central Himalaya down through the hilly parts of Burma to Malaysia, in Java, where it is more common in mid and east Java than in west Java; in the Peninsula it occurs throughout the lowlands except deep in the forests. It occurs at Fraser Hill up to 4100 ft. in some abundance.

Bidens pilosa, Linn.: King & Gamble in Mat., 74, pt. 2, p. 45: Koorders, 3, p. 339: Merrill, p. 589. A herbaceous weed pantropic, not uncommon through the Malay Peninsula in the lowlands and not absent from the hills though few have taken the trouble to record any observations on it. Mr. Ridley, however says of it, that it is found in Sakai clearings in the mountains of Telom. It was found under Fraser Hill in the mine area of the upper Tras valley at 3300 ft. (7880) in flower.

Frechtites valeriaracifolia, D. C.: Koorders, 3, p. 342: Merrill, p. 589. A herb of American origin becoming pantropic; in the Peninsula as yet rare: but occurring in Sumatra, Java (which it reached in 1845 with coffee seed) Dutch Borneo. It is found at Fraser Hill (s.n.)

Gynura bicolor, D. C.: King & Gamble, Mat., 74, pt. 2, p. 40. A herbaceous weed occurring in southern China and down to Malaysia, where it occurs up and down the Peninsula: found plentifully about the mines at Fraser Hill (s.n.) in fruit.

Gynura sarmentosa, D. C.: King & Gamble, Mat., 74, pt. 2, p. 39: Koorders, 3, p. 344: Merrill, p. 590. A sprawling herb, distributed from Siam into Sumatra and western Malaysia generally and through to the Philippine islands and New Guinea: in Java it is more common in the western end than elsewhere. In the Peninsula it occurs in the plains southward to Singapore, and it has been recorded for the mountains thus,—the Taiping hills, and the Main range from the mountains of Telom to the old road from Kuala Lumpur into Pahang. It was found under Fraser Hill at 3300 ft. towards the Gap in flower and in fruit (7763) on a cleared hill side.

Emilia sonchifolia, D. C.: King & Gamble, Mat., 74, pt. 2, p. 38: Koorders, 3, p. 345: Merrill p. 590. A herbaceous pantropic weed, common through the Peninsula, and recorded as ascending high upon the Taiping hills. It was found but not abundantly at 4000 ft. at Fraser Hill, and under it in the mine area of the upper Tras valley (7826).

CAMPANULACEAE.

Pratia begoniifolia, Lindl.: Koorders, 3, p. 303. A small creeping herb distributed from the central Himalaya and southern China through Burma to Sumatra, the Malay Peninsula and Java: in the Peninsula it occurs in the Main range from G. Kerbau to G. Menuang gasing. At Fraser Hill it is quite common about clearings, and possibly owes its abundance there more to man than to landslides.

Pentaphragma Scortechirii, King & Gamble, Mat., 74, pt. 2, p. 53: An herb of forest, distributed through the Peninsula and reaching Lingga. In the north of the Peninsula it is generally upon hills, but it reaches sea-level in Singapore and southern Johore: it occurs in Penang, in the Taiping hills, at 3000-4000 ft., on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom and G. Bujong Malaka into Negri-Sembilan on Bukit Sutu: it is also on the hills of the Dindings, on G. Keledang near Ipoh, and on G. Pulai in Johore. At Fraser Hill it is not uncommon and was in flower (8625).

VACCINIACEAE.

Agapetes Griffithii, C. B. Clarke: King & Gamble, Mat., 74, pt. 2, p. 59. A woody epiphyte with a swollen tap root, functioning as a store for water, endemic and montane, found on the Taiping hills, on the Main range at G. Batu Puteh and now at Fraser Hill, and old specimens are labelled "Malacca," which means Mt. Ophir.

At Fraser Hill it is common (7828). These Fraser Hill plants have the calyx slightly larger than the Taiping hills plants.

Agapetes micrantha, Ridl. ms in Herb. Singap. A shrub, endemic and very local in the Main range, having been collected first at Fraser Hill and now on Pine-tree hill (8537), but without flowers.

Pentapterygium Scortechinii, King & Gamble, Mat., 74, pt. 2, p. 60. A woody epiphyte endemic, and montane, occurring upon the the Main range from the mountains of Telom to Pine-tree hill where it was found at 4800 ft. in flower and in fruit (8548). King's collector gave its altitude as about 4500 ft. in Perak.

ERICACEAE.

Diplycosia latifolia, Blume: King & Gamble, Mat., 74, pt. 2, p. 71: Koorders, 3, p. 8: Merrill, p. 464. A small shrub, with an abnormal distribution as follows,—in Sumatra, in the Peninsula on G. Tahan, on the Main range in Perak and down to Bukit Etam, on Benom, in Borneo in Dutch Borneo and in Java upon Tosari near the eastern end of the island. It was found in fruit at Pine-tree hill (8532).

Diplycosia sp.: Merrill, p. 464: *Vaccinium microphyllum*, King & Gamble, Mat., 74, pt. 2, p. 62. A shrub, apparently endemic occurring on Kedah peak on the Taiping hills, on the Main range from G. Batu puteh to Bukit Etam, and on Mt. Ophir. At Fraser Hill it is very abundant (7895, 8942).

Rhododendron Wrayi, King & Gamble, Mat., 74, pt. 2, p. 75. A shrub, endemic and montane, found on G. Tahan, and on the Main range on G. Kerbau, in the mountains of Telom and southwards to G. Ulu Semangkok. It was found to be one of the most abundant of woody plants upon the top of Pine-tree hill, and was in fruit (8539).

Rhododendron jasminiflorum, Hook. f.: King & Gamble, Mat., 74, pt. 2, p. 88: Koorders, 3, p. 7: Merrill, p. 461. A shrub in distribution from Sumatra, in the Malay Peninsula and in Borneo: it is doubtful if it has occurred wild in Java. In the Peninsula it occurs on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range in the mountains of Telom and down to Fraser Hill; and it occurs on Mt. Ophir. It was found in flower at Fraser Hill (8427).

Rhododendron malayanum, Jack: King & Gamble, Mat., 74, pt. 2, p. 78: Koorders, 3, p. 6: Merrill, p. 462. A shrub generally epiphytic, distributed through western Malaysia in Sumatra, the Peninsula, western Java and Borneo: in the Peninsula on the Taiping hills on G. Tahan, on the Main range from G. Kerbau to Bukit Etam and on Mt. Ophir. It is common about Fraser Hill, and was in flower and in fruit (7815, 8436); and

thence it continues to Pine-tree hill (8545). The statement that it occurs in Penang is an error as far as it is based upon the Singapore herbarium, where a specimen from Taiping hills has been mislabelled "Penang."

Vaccinium bancanum, Miq.: King & Gamble, Mat., 74, pt. 2, p. 64: J. J. Smith in Meded. Dept. Landbouw, 18, p. 159: Merrill, p. 465. A small tree found in the Malay Peninsula, in Banca, in Borneo and Billiton and in a variety in Java. It occurs at Fraser Hill upon the vein-quartz ridges and was in flower (8928). In the Peninsula it grows on the Taiping hills, on the Main range about the Semangkok pass, and on Mt. Ophir.

MYRSINACEAE.

Maesa perakensis, Ridl. in Jour. F. M. S. Mus. 4, p. 45. A bush, endemic and montane, distributed in the Taiping hills and upon the Main range from the mountains of Telom to the Semangkok pass. At Fraser Hill and in the upper Tras valley below it, it is not at all uncommon and was in flower and in fruit (s.n.)

Embelia Ribes, Burm. f.: King & Gamble, Mat., 74, pt. 2, p. 104: Koorders, 3, p. 30: Merrill, p. 476. A woody climber, of wide distribution, extending from the central Himalaya to Ceylon and from southern China down into Malaysia in Sumatra, the Peninsula west Java and northern Borneo. In the Peninsula it is through the low country; it ascends into the mountains of Telom, and was found in fruit at Fraser Hill (8619).

Labisia pumila, Benth. & Hook. f.: King & Gamble, Mat., 74, pt. 2, p. 115: Koorders, 3, p. 30: Merrill, p. 473. A half-woody herb, variable, and of rather general distribution in Indo-china and through Malaysia, from Sumatra, through the Peninsula, and Java, in Borneo and to the Philippines: it is in all parts of the Peninsula down to Singapore, and in the Dutch islands south of Singapore and in the Taiping hills and Main range is developed into the variety *alata*. It is very common at Fraser Hill, (8450), but at the season of our visit generally sterile.

Labisia longistyla, King & Gamble, Mat., 74, pt. 2, p. 117. A half-woody herb, endemic and montane, very restricted apparently on the Main range where it has been collected only on the section between G. Kerbau and the mountains of Telom and the Semangkok pass. At Fraser Hill it is much less common than *L. pumila*, but in ascending to Pine-tree hill it gradually increases in abundance (8538), until it has replaced the other. Its leaves are of a lighter green than those of *L. pumila*, and its fruits a trifle larger.

Ardisia retinervia, Ridl. in Jour. Linn: Soc. Bot. 38, p. 315. A shrub, endemic and montane, described upon specimens collected on G. Tahan above 5000 ft., and now its range is extended to Fraser Hill, where it is one of the species growing upon the vein-quartz ridges (7833).

Ardisia chrysophyllifolia, King & Gamble, Mat., 74, pt. 2, p. 123. A small shrubby plant, endemic and local, found on the Main range from G. Kerbau and Ridley's G. Berumban and G. Batu puteh to G. Ulu Semangkok. It is frequent at Fraser Hill, in flower (8528), as well as in fruit (8559), and was found on the south east side of the Gap upon G. Ulu Semangkok.

Ardisia colorata, Roxb.: King & Gamble, Mat., 74, pt. 2, p. 130; Koorders, 3, p. 28; Merrill, p. 470. A small tree of rather wide distribution,—from north-eastern India through Burma into Sumatra, the Peninsula and Borneo, and to mid Java: in the Peninsula it is general in the low country and upon the mountains normally at any rate to 2000 ft.: it ascends higher also—thus to the crest of the hills in Penang at 2500 ft., on the Taiping hills, and on the Main range on G. Kerbau, on Ridley's G. Berumban and elsewhere and at Fraser Hill it is abundant about 4000 ft. and attains 50 ft. in height. It is at the Padang Batu on Mt. Ophir. Our no. (8514) is the type and our no. (8698) is the variety *complanata*. The Malays call it Nielo utan.

Ardisia rosea, King & Gamble, Mat., 74, pt. 2, p. 150. A small shrub, endemic and montane, distributed on the Taiping hills, on G. Tahan and on the Main range from the mountains of Telom to the G. Ulu Semangkok, where we got it in flower (8891).

Ardisia Maingayi, King & Gamble, Mat., 74, pt. 2, p. 151. An undershrub, of 2-3 ft., endemic and apparently montane, occurring on G. Tahan, on the Main range from the mountains of Telom to G. Ulu Semangkok, and then on Mt. Ophir (Maingay's "Malacca" specimens doubtless being thence). We found it at Fraser Hill (8410), and on G. Ulu Semangkok (8874).

SAPOTACEAE.

Payena? A Sapotacea occurs on the ridge of Fraser Hill, possibly of this genus, a tree 100 ft. high (7766) of which no more than the foliage could be obtained.

EBENACEAE.

Diospyros Scortechinii, King & Gamble, Mat., 74, pt. 2, p. 212. A tree, endemic, montane except that it appears to occur low down in P. Tioman off the east coast: in Penang, in the Taiping hills, and on G. Bubu, in the Main range from G. Bujong Malaka to Ginting Bidai east of Kuala Lumpur. It was collected in fruit on G. Ulu Semangkok (8883).

Maba perakensis, King & Gamble, Mat., 74, pt. 2, p. 205. A small tree, recorded only from Perak (no exact locality). At Fraser Hill about 30 ft. high, with blackish bark and small fruits (7855).

***Maba* sp.** A small tree, resembling the preceding, apparently hitherto undescribed (7851).

STYRACEAE.

Symplocos ophirensis, C. B. Clarke: King & Gamble, Mat., 74, pt. 2, p. 246. A bush, endemic and montane, occurring on G. Bubu on the Main range from the Semangkok pass southwards to G. Mengkuang lebar between 3800 and 5000 ft., and on Mt. Ophir. We found it at the Trigonometrical station immediately south-east of the Gap of the Semangkok pass in fruit (8873). Its flowers have been obtained in December and May-June on Mt. Ophir; in January-February on G. Mengkuang lebar; and in August-September in the Semangkok pass.

Symplocos rubiginosa, Wall.: King & Gamble Mat., 74, pt. 2, p. 247; Merrill, p. 488. A tree, distributed in the interior of western Malaysia,—in Sumatra, in the Peninsula and in Borneo. In the Peninsula it occurs in the hilly districts in the north, but descends to the sea-level in the south. It was found in fruit at 4000 ft. (8597).

Symplocos sp. A species of this genus near *S. perakensis*, King & Gamble, was found about Fraser Hill (7780, 8614). It differs from *S. perakensis* in the calyx and in the presence of teeth along the leaf margin

OLEACEAE.

Jasminum Griffithii, C. B. Clarke: King & Gamble, Mat., 74, pt. 2, p. 257. A woody climber, endemic, occurring from Penang, down to Singapore upon the west side of the Peninsula, and now found in the Main range at Fraser Hill in fruit (7817).

Jasminum Scortechinii, King & Gamble, Mat., 74, pt. 2, p. 264. A woody climber endemic and montane, occurring on the crest of the hills in Penang, on the Taiping hills from 1500 to 4000 ft., and now recorded from Fraser Hill where it is plentiful, but it was not seen in the direction of Pine-tree hill, where the land rises above 4300 ft. It was in flower (8403), its flowers very fragrant, and also, but rarely, in fruit (8954).

APOCYNACEAE.

Alyxia pumila, Hook. f.: Gamble, Mat., 74, pt. 2, p. 420. A climber, thick leaved, endemic, occurring in the Main range from G. Bujong Malaka to the Semangkok pass and perhaps on Mt. Ophir, found in flower at Fraser Hill (8566, 8575), and at the Trigonometrical station immediately above the Gap on its south-east side (8871).

Alyxia Forbesii, King & Gamble: Gamble, Mat., 74, pt. 2, p. 420. A climber occurring in Sumatra and in the Malay Peninsula and in Java: montane, in Penang (formerly, but perhaps no longer) on the Taiping hills, on the Main range from the mountains of Telom to G. Mengkuang lebar, on Benom, and on G. Pulai in Johore. It was obtained at Fraser Hill at 4300 ft. (7839).

ASCLEPIADACEAE.

Dischidia astephana, Scortechini: Gamble, Mat., 74, pt. 2, p. 582. A herbaceous epiphyte, endemic, and montane, occurring in the Taiping hills from 3600 ft. upwards, on G. Tahan, on the main range from G. Bujong Malaka to Bukit Etam, on Benom, and lastly in Ulu Kuantan at a fairly low level. It occurs at Fraser Hill and forward to the summit of Pine-tree hill at 4800 ft. (8530) in flower and in fruit.

Dischidia albida, Griff.: Gamble, Mat., 74, pt. 2, p. 588. A herbaceous epiphyte, endemic, occurring on the Taiping hills, on G. Tahan, on the Main range from G. Batu puteh to the Semangkok pass, on Mt. Ophir and on G. Pulai. It was got near Pine-tree hill at 4600 ft. (8643) carrying its greenish white flowers.

Dischidia Scortechinii, Gamble, Mat., 74, pt. 2, p. 592. A herbaceous epiphyte, endemic and assuredly montane, but the locality whence the type came is unrecorded. We obtained it at Fraser Hill (8411) bearing its creamy white flowers.

Dischidia rosea, Ridl., in Jour. St. Br. Roy. As. Soc., 61, p. 31. A herbaceous epiphyte, endemic and local: the type came from the neighbourhood of Fraser Hill, where we found it carrying its pretty rose-pink flowers (8652).

LOGANIACEAE.

Fagraea oblonga, King & Gamble; King, Mat., 74, pt. 2, p. 612. A woody epiphyte, endemic and montane, distributed in the Taiping hills, and on the Main range from the mountains of Telom to the Semangkok pass. It was obtained at Fraser Hill in fruit (7861).

Fagraea sp. A shrub in half-ripe fruit, differing from the only specimen of *F. lanceolata* Blume, which we have seen, in having more mucronate leaves. *F. lanceolata* occurs in the Malay Peninsula only in Perak; and it is in Java. The Fraser Hill specimens bear the no. 7821.

Strychnos Scortechinii, A. W. Hill in Kew Bull. 1917, p. 168. A woody climber, endemic and montane, or submontane; it occurs under the west slope of the Taiping hills, and under the west slope of the Main range in Perak and Selangor as far south as Kuala Lumpur. We obtained it in the Valley at Fraser Hill (8675) carrying its grey-green fruits.

Gaertnera intermedia, Ridl. in Jour. F. M. S. Mus. VI, p. 163. A shrub, endemic and montane, quite local: the type came from the Semangkok pass, and we found it in flower and in fruit at Fraser Hill and forward to Pine-tree hill (7823, 8608, 8521, 8864 and s.n.) in flower and in fruit.

Gaertnera Koenigii, Wight: King, Mat., 74, pt. 2, p. 623; Koorders, 3, p. 276. A large shrub, with a broken distribution, in

Ceylon, where it is very common from sea-level up to 3000 ft., and in the Malay Peninsula on Kedah peak, on the Taiping hills, on the Main range from G. Kerbau and the mountains of Telom to G. Mengkuang lebar: it was obtained a century ago in Singapore. C. B. Clarke, who of Malayan material had the Singapore specimen alone before him named it as a variety *oryphylla* in Sir Joseph Hooker's Flora of British India 4. p. 91. Koorders states that its record for Java is an error. The flowers are very fragrant (8552, 8579).

BORAGINACEAE.

Tournefortia Wallichii, D. C.: King, Mat., 74, pt. 2, p. 280: A half-woody herb, occurring in the Nicobars, and in the Malay Peninsula from Lower Siam down to Singapore, in Sumatra and perhaps also in Java: found below Fraser Hill in the mined area of the upper Tras valley (7862), in flower.

CONVOLVULACEAE.

Lettsomia adpressa, Miq.: Prain, Mat., 74, pt. 2, p. 324. A woody climber, endemic, occurring in the lowlands of the Peninsula from Penang to Malacca: and found at the Gap in the Semangkok pass by the roadside as if a recent intruder, in flower (8884).

Lettsomia penangiana, Miq.: Prain, Mat., 74, pt. 2, p. 325. A woody climbing endemic, montane and submontane in the Peninsula, occurring in Penang to the crests of the hills, in the Taiping hills up to 4000 ft., and now found on the Main range at Fraser Hill up to 4000 ft. (7770, 8629). It carried its flowers and its magenta fruit, and occurred in cleared places.

SOLANACEAE.

Solanum nigrum, Linn.: Prain, Mat., 74, pt. 2, p. 329. Koorders, 3, p. 164. A herb, pantropic and extending into temperate countries all round the World. In the Peninsula scattered chiefly about the more cultivated regions. It is not yet recorded as present in Borneo. At Fraser Hill and in the mined area of the upper Tras valley it occurs plentifully, and was both in flower and in fruit.

Solanum verbascifolium, Linn.: Prain, Mat., 74, pt. 2, p. 329: Koorders, 3, p. 165: Merrill, p. 522. A half-woody herbaceous shrub, pantropic. In the Peninsula here and there throughout the more cultivated regions. At Fraser Hill a result of the interference of man, and plentiful in the old mines.

SCROPHULARIACEAE.

Scoparia dulcis, Linn.: Prain, Mat., 74, pt. 2, p. 362: Koorders, 3, p. 180: Merrill, p. 525. An American herb rapidly be-

coming pantropic: in the Peninsula not uncommon in the lowlands, where most settled. At Fraser Hill found by the old dam which is at 4100 ft.

GESNERACEAE.

Cyrtandra pilosa, Blume: Ridley, Mat., 74, pt. 2, p. 791. Koorders, 3, p. 200. A herb about 3 ft. high, occurring in Tenasserim, Sumatra the Malay Peninsula and in west Java. In the Peninsula found in Penang, on the Taiping hills, on the Main range from the neighbourhood of the Semangkok pass to Bukit Sutu in Negri-Sembilan, and on G. Pantai and G. Pulai in Johore. At Fraser Hill it occurs not as a shrub as described in the Flora of British India, but as a half-woody herb about 3 ft. high: and is found in gullies by water: it was in flower and with half ripe fruit (7890, 8615, 8950).

Agalmyla staminea, Blume: Ridley, Mat., 74, pt. 2, p. 738: Koorders, 3, p. 195. A beautiful epiphytic herb, distributed from Sumatra, into the Malay Peninsula and in west and mid Java. In the Peninsula it occurs from 1000 to 3500 ft. on the Taiping hills, and on the Main range it occurs from G. Kerbau, and G. Bujong Malaka to the Semangkok pass. Its elevation in Java is from 4300 to 5000 ft. At Fraser Hill it is common, but it was rarely in flower (8587).

Aeschynanthus perakensis, Ridl.: Ridley, Mat., 74, pt. 2, p. 734. An epiphyte and also on rocks, herbaceous, endemic, occurring on the Taiping hills and on the Main range from G. Kerbau and the mountains of Telom to the Semangkok pass. It was found by us at Fraser Hill (7888) and in the upper Tras valley at 3600 ft. (8859) in flower.

Aeschynanthus longicalyx, Ridl.: Ridley, Mat., 74, pt. 2, p. 735. A beautiful herbaceous epiphyte, endemic and confined to the Main range from G. Kerbau and the mountains of Telom to G. Mengkuang lebar. It occurs at Fraser Hill (Hose 46) and was found by us at Pine-tree hill (8531) in flower.

Aeschynanthus lobbiana, Hook.: Ridley, Mat., 74, pt. 2, p. 735: Koorders, 3, p. 194: *Trichosporum lobbianum*, O. Kze. Merrill p. 550. An epiphyte, herbaceous, distributed in the interior of western Malaysia, Sumatra, the Peninsula, and Borneo, and recorded as occurring in Java, but the record is not properly authenticated. In the Peninsula on G. Raya in Lankawi, on Kedah peak, on the Taiping hills: on the Main range from G. Kerbau to the neighbourhood of Kuala Lumpur, on Mt. Ophir, and on G. Pulai in Johore, also on the east coast from Kuantan and down to Singapore and at a low level at Ayer Panas in Malacca. It was in flower on Pine-tree hill (8549), its flowers very large.

Aeschynanthus sp. A common epiphyte about Fraser Hill found in flower (8418 and s.n.) and appearing to be a species new to the Peninsula.

Cyrtandromoea megaphylla, Hemsl.: Ridley, Mat., 74, pt. 2, p. 788. A rather coarse herb, endemic, found on Kedah peak, on the Taiping hills, on the Main range from the mountains of Telom to Ginting Peras in Selangor. It was found, 4-5 ft. high at Fraser Hill on cleared ground at 4100 ft. (8560) carrying its large white flowers well under the leaves.

Didymocarpus flavescens, Ridl.: Ridley, Mat., 74, pt. 2, p. 749. A herb, endemic and local, occurring only about the Semangkok pass, and once collected under it near Kuala Kubu. It was both in bud and in fruit (8637).

Didymocarpus sp., intermediate between *D. flavescens* and *D. hirta*, with the leaves of the former and the large flowers of the latter was collected (8440).

Didymocarpus crinita, Ridl.: Ridley, Mat., 74, pt. 2, p. 748: A herb relatively tall among the Didymocarps, endemic and local, known only from the neighbourhood of the Semangkok pass. It was plentiful and in flower (8404, 8572, 8580, 8670) at Fraser Hill.

Didymocarpus malayana, Hook.: Ridley, Mat., 74, pt. 2, p. 752. A herb with beautiful yellow flowers, endemic, and apparently confined to the Main range, whereon it occurs from G. Kerbau and G. Bujong Malaka to Ginting Bidai. It occurs in some abundance about Fraser Hill and was in flower and rarely in fruit (8640).

Didymocarpus platypus, C. B. Clarke: Ridley, Mat., 74, pt. 2, p. 757: A white-flowered herb, distributed in Sumatra and the Malay Peninsula. In the Main range it occurs from G. Batu Puteh southwards to G. Angsi, descending the slopes to quite low levels, and in the south of the peninsula it reaches sea-level at Singapore. It was not easily found at Fraser Hill, but carried flowers (8949).

Didymocarpus quinquevulnera, Ridl.: Ridley, Mat., 74, pt. 2, p. 758. A rather untidy herb with a very pretty flower, endemic, occurring on G. Tahan, and upon the Main range from G. Kerbau to the neighbourhood of Kuala Lumpur where it descends to quite low levels. About Fraser Hill it was at the time of our visit the most evident of the Didymocarps upon the slopes of the ridges, generally with violet flowers, the throat white (8610), but sometimes with white flowers (8611).

Didymocarpus crinita, Ridl.: Ridley, Mat., 74, pt. 2, p. 748: Merrill, p. 527. A herb, montane and submontane in the Peninsula, extending to Borneo. In the Peninsula occurring on Kedah peak, on the Penang hills, on the Taiping hills, on the Main range from G. Kerbau and near Tapah to Bukit Tangga near Seremban and down the slopes on the west side almost to the base, at Temerloh in Pahang and on G. Pulai in Johore. At Fraser Hill it is common in the variety *Curtisii*, and carried deep violet flowers (8563, 8652).

Didymocarpus venusta, Ridl.: Ridley, Mat., 74, pt. 2, p. 760. A pretty white flowered herb, endemic and montane, restricted to the Main range from G. Bujong Malaka and the mountains of Telom to the Semangkok pass. It was just coming into flower at 4300 ft. (1894) in damp places at Fraser Hill.

Didymocarpus pumila, Ridl.: Ridley, Mat., 74, pt. 2 p. 763. A small herb, with a pretty deep violet flower, which is endemic and local. It was described from the Semangkok pass and occurs at Fraser Hill on one of the vein-quartz ridges (8657). It was in flower and in fruit.

ACANTHACEAE.

Thunbergia alata, Sims: C. B. Clarke, Mat., 74, pt. 2, p. 632: Koorders, 3, p. 213: Merrill, p. 538. An african herbaceous climber, which is gradually becoming pantropic: in the Peninsula as yet only in a few places. It occurs on the roadside near the Gap.

Staurogyne subglabra, C. B. Clarke, Mat., 74, pt 2, p. 640. A half woody herb, endemic, found on Kedah peak, on the Taiping hills and on the Main range from the mountains of Telom to the Semangkok pass. We found it in the valley at Fraser Hill in flower (7781).

Strobilanthes hirtisepalus, C. B. Clarke, Mat., 74, pt. 2, p. 656. A weak shrub, endemic, occurring on Kedah peak, on the Taiping hills and on the Main range in the mountains of Telom. We found what is believed to be it, flowerless, at Fraser Hill in forest (8616).

Filetia hirta, Ridl. in Jour. Str. Br. Roy. As. Soc. 61, p. 35. A creeping herb, endemic and local found only upon the Main range in the neighbourhood of the Semangkok pass. It is quite common at Fraser Hill with lemon yellow flowers (8408, 8576) or with salmon yellow flowers (8577). The Hon'ble Mr. G. Hose obtained it in flower in July, and Mr. Ridley in August.

Filetia paniculata, C. B. Clarke Mat., 74, pt. 2, p. 670. A tall herb, endemic, and of restricted distribution upon the Main range, having been collected by Scortechini at some unrecorded part of Perak, and by Ridley near the Semangkok pass. It was found by us 6 ft. high in forest at Fraser Hill (8601) with pale yellow flowers.

Justicia subalternans, C. B. Clarke, Mat., 74, pt. 2, p. 685. A herb, endemic and local, described from specimens collected about the foot of the Main range in Perak. The specimens from Fraser Hill diverge slightly, and therefore some doubt exists as to the determination of our specimens: they bear the number 8441. They carried pale yellow flowers and a few fruits.

VERBENACEAE.

Vitex gamosepala, Griff.: Gamble, Mat., 74, pt. 2, p. 855. Merrill, p. 514. A small tree occurring in Sumatra, the Malay

Peninsula and Borneo: in the Peninsula it is mostly submontane: it is found from Lower Siam (Tomoh) to Singapore down both sides of the Peninsula: how far it ascends the hills is not yet to be recorded. It was found at Fraser Hill upon the edge of forest; but would scarcely owe its presence in the station to the clearing by man (7793), in flower.

Clerodendron deflexum, Wall.: Gamble Mat., 74, pt. 2, p. 828. A small shrub, in distribution endemic, in the north of the Peninsula montane or submontane, but descending low in the south: it occurs on Kedah peak at 1500 and 3500 ft., on the Penang hills from 500 ft. upwards; on the Taiping hills, on G. Tahan on the Main range from the mountains of Telom to the neighbourhood of Kuala Lumpur, on Benom, in Malacca, Johore and Singapore as well as on the coast of Pahang. At Fraser Hill in flower (7819).

Clerodendron diversifolium, Blume: Gamble, Mat., 74, pt. 2, p. 829: Koorders, 3, p. 137: Merrill, p. 516. A shrub, distributed through western Malaysia, Sumatra, the Peninsula, Java, and Borneo. In the Peninsula throughout at low levels, and on the mountains, though little observed. It was found not uncommonly ascending to 4300 ft. at Fraser Hill, in flower (7782).

Clerodendron paniculatum, Linn.: Gamble, Mat., 74, pt. 2, p. 838. A tall herb extending from Siam through the low country of the Malay Peninsula to Singapore, found under Fraser Hill in the upper Tras valley at about 3300 ft. (8861).

LABIATAE.

Hyptis brevipes, Poit.: Prain, Mat., 74, pt. 2, p. 704: Koorders, 3, p. 153: Merrill, p. 520. A herb of American origin, now pantropic, found in the more thickly populated parts of the lowlands of the Peninsula, and occurring at 3300 ft. under Fraser Hill in the direction of the Gap by new buildings (7773) in fruit.

Gomphostemma sp. near *G. oblongum* Wall., but with a white corolla, was found at Fraser Hill in deep shade (8650).

PLANTAGINACEAE.

Plantago major, Linn.: Prain Mat., 74, pt. 2, p. 727: Koorders, 3, p. 231: Merrill, p. 543. A herb, common round the World in temperate countries, and invading the tropics with the help of man, persisting with a little encouragement about villages even in Singapore island. At Fraser Hill observed at 4100 ft. and under Fraser Hill in the mine area of the upper Tras valley.

AMARANTACEAE.

Amaranthus viridis, Linn.: Gamble, Mat., 75, p. 11: Koorders 2, p. 197: Merrill, p. 246. A pantropic herbaceous weed, frequent through the Malay Peninsula, and found under Fraser Hill at 3300 ft. in flower and fruit, by new buildings.

POLYGONACEAE.

Polygonum chinense, Linn., Gamble, Mat., 75, p. 22: Koor-
ders, 2, p. 184: Merrill, p. 245. A herb occurring on the mount-
ains of southern India and Ceylon; in the Himalaya and through
China to Japan, southwards through Burma and Siam to Malaysia,
where it occurs in Sumatra, the Peninsula, Borneo, Java, Timor,
and the Philippines. It occurs throughout Java both high and
low: in the Peninsula it is montane but descends cool mountain
streams to the edge of the low country along the Main range from
G. Kerbau and the mountains of Telom to the Semangkok pass.
At Fraser Hill it is common near the old mines, and newer
clearings, (8424), and about the old mines in the upper Tras valley.

NEPENTHACEAE.

Nepenthes sanguinea, Lindl.: Macfarlane, Mat., 75, p. 283:
Merrill, p. 285. A half woody climber, occurring in the Peninsula
and in Borneo: in the Peninsula found on the Taiping hills and
G. Bubu, on G. Tahan, on the Main range from G. Bujong Malaka
and the mountains of Telom to Bukit Etam, on Benom and on
Mt. Ophir. At Fraser Hill it is by no means uncommon from
below at 3500 ft. almost to the summit of Pine-tree hill at 4800
ft. It was in flower and in fruit at 4200 ft. (8630), but not below
(7878).

PIPERACEAE.

Piper stylosum, Miq.: C. de Candolle, Mat., 75, p. 302:
Merrill, p. 209. A herb, extending through the interior of western
Malaysia,—Sumatra, the Malay Peninsula and Borneo. In the
Peninsula it is chiefly montane, occurring in the Taiping hills,
on G. Tahan, on the Main range from G. Bujong Malaka, and
the mountains of Telom to G. Tampin; and at low levels elsewhere
particularly in Selangor, and Johore and on P. Tioman. It is
common at Fraser Hill (8439), carrying its white flowers.

Piper semangkoanum, C. de Candolle, Mat., 75, p. 304.
A herb, endemic and restricted to the Taiping hills, and the neigh-
bourhood of the Semangkok pass: however on G. Tahan there is
a closely allied plant (Md. Haniff & Md. Nur, 8150). At Fraser
Hill it occurs sporadic in the forest (8438, 8544), and carried
white flowers as well as nearly ripe fruit.

MYRISTICACEAE.

Horsfieldia lemanniana, Warb.: Gamble, Mat., 75, p. 219.
A tree, endemic, found chiefly in the lowlands of the west side
of the Peninsula but recorded from the Taiping hills, and the
lower slopes of the Main range in Perak. It was found at Fraser
Hill as a small tree branching like a *Garcinia*, i.e. with long stiff
side branches, and was in fruit (8679).

LAURACEAE.

Dehaasia? A rather tall tree in fruit with leaves 9 x 3.5 cm. which dry brown (7833), at Fraser Hill.

Cinnamomum rhynchophyllum, Miq.: Gamble, Mat., 75, p. 78. A small tree, occurring in Sumatra and locally in the Malay Peninsula, submontane as in Larut and at Tapah in Perak. This tree, up to 20 ft. high, is plentiful at Fraser Hill: it has been identified from descriptions. It smells strongly of camphor, and carries flowers and young fruit (7758, 8447, 8801).

Cinnamomum mollissimum, Hook. f.: Gamble Mat., 75, p. 82. A tree, endemic, occurring in Penang, on the Taiping hills, on G. Tahan and down the Main range from near Gopeng to Negri Sembilan. At Fraser Hill it occurred as a big tree, with remarkably fragrant bark and white wood (8700), sterile.

Cinnamomum aureofulvum, Gamble, Mat., 75, p. 84. A small tree, endemic and strictly local. It occurs at Fraser Hill on one of the vein-quartz ridges (8940), being sterile in September; it was collected in 1904 by Mr. Ridley on G. Ulu Semangkok; and a somewhat similar plant has been obtained on G. Ulu Kali, a mountain which is again a little further south.

Phoebe cuneata, Blume: Gamble Mat., 75, p. 109: Koorders, 2, p. 265. A tree occurring in the Malay Peninsula and in west Java; found in the Peninsula in the lowlands from Province Wellesley to Singapore, but montane also, as it has been obtained at 4100 ft. on the Taiping hills, and on the Main range at G. Batu puteh. Our Fraser Hill specimens were got with fruit at 4200 ft. (7807), and not altogether agreeing with the lowland plant may prove when the flower is collected to differ. The fruit is green and its pedicel red.

Litsea citrata, Blume: Gamble, Mat., 75, p. 146: Koorders, 2, p. 272: Merrill, p. 276. A small tree widely distributed from the Himalaya and southern China to Malaysia, where it is in Sumatra, the Peninsula, Borneo and Java. In the Peninsula it is montane occurring on the Taiping hills and on the Main range from the mountains of Telom to the Semangkok pass. On the Taiping hills it occurs at 3000 ft. About Fraser Hill it is common on cleared ground and was found in flower at 4000 ft. (s.n.); and it occurs about the old mines in the upper Tras valley. Its white flowers are fragrant. Its smooth green bark is characteristic. It appears suitable for sowing on elevated abandoned mine-areas.

Litsea penangiana, Hook. f.: Gamble, Mat., 75, p. 154. A small tree, and montane, occurring in Sumatra and on the crest of the hills in Penang, on G. Bubu, and on the Main range from G. Batu puteh down to the neighbourhood of Kuala Lumpur where it descends to a low level. At Fraser Hill it is common and was in flower and with half ripe fruit (7804, 8448, 8699).

Litsea castanea, Hook. f.: Gamble, Mat., 75, p. 155. A bush or small tree, endemic, occurring in the low country from Larut through Selangor to Malacca; and now found at 4200 ft. at Fraser Hill (7884).

Litsea machilifolia, Gamble, Mat., 75, p. 171. A small tree, endemic, montane or submontane, occurring on the Penang hills at 1000 ft., on the Taiping hills down to the base, on the Main range from G. Batu Puteh to G. Tampin, and in the low country of Malacca and on to Singapore. At Fraser Hill it is common in the forest right to the tops of the hills at 4300 ft., carrying flowers and more commonly its large marble-like green fruits on swollen orange pedicels (7784, 8667, 8809).

***Litsea* sp.** A tree of 60 ft. in height, with some affinity to *L. cordata*, Hook. f., the leaves measuring up to 18 x 9 cm., at Fraser Hill in fruit (7762).

***Litsea* sp.** A small tree in flower and in fruit with leaves measuring up to 11 x 4 cm., at Fraser Hill (s.n.).

***Litsea* sp.** A small tree with harsh leaves measuring up to 14 x 6 cm. in flower on a vein-quartz ridge (8931).

Lindera malaccensis, Hook. f.: Gamble, Mat., 75, p. 194: Merrill, p. 197. A small tree distributed from the Malay Peninsula to Borneo. In the Peninsula from the Larut plains to Singapore at low levels: and this is the first record of its occurrence at some elevation. It was got at 4200 ft. (8689).

Lindera Wrayii, Gamble, Mat., 75, p. 196. A bush, endemic, and in the Peninsula confined to the Taiping hills, and the Main range from the mountains of Telom to the Semangkok pass. We found it as a bush up to 10 ft. in height, both in flower and with fruit (8565, 8569, 8642), and again on G. Ulu Semangkok (8879).

Lindera caesia, Boerl.: Gamble, Mat., 75, p. 200: Merrill, p. 279. A small tree found in the Malay Peninsula, Borneo and Java. In the Peninsula it occurs on the Taiping hills, on G. Tahan, in the Main range near the Semangkok pass and south to G. Mengkuang lebar, its limits being as far as known 3000 and 5000 ft. It was found at Fraser Hill just inside the edge of a gully, in flower (7881) and again in fruit (7769).

***Lindera*?** A tree (7837), found at 4200 ft. appears also to be another species of *Lindera*.

***Lindera*?** A tree 80 ft. high, and 60 ft. to the first branch was found at 4200 ft. with fruit going pink, which is thought to be a *Lindera* (7857).

CHLORANTHACEAE.

Chloranthus officinalis, Blume: Gamble, Mat., 75, p. 33: Koorders, 2, p. 40: Merrill. p. 209. A half-woody herb, distributed

from the eastern Himalaya and south-western China southwards through Burma the Andamans, and through Malaysia to the Philippines and New Guinea: in Java it occurs from 900 ft. to 6000 ft. In the Peninsula it is found in the lowlands in Penang and elsewhere, and is on the Main range. Below Fraser Hill it was found at 3500 ft. towards the Gap in fruit (7772).

Chloranthus brachystachys, Blume: Gamble, Mat., 75, p. 34: Koorders, 2, p. 41: Merrill, p. 209. A half-woody plant, rather more montane than *C. officinalis*, distributed from southern India and Ceylon and from Japan and the mountains of Assam, southwards through Burma to Malaysia where it occurs in Sumatra the Peninsula, Lingga, west and mid Java and north Borneo. In the Peninsula it is found in Penang, and on the Main range from the mountains of Telom and G. Bujong Malaka to the Semangkok pass. At Fraser Hill it is common and we found it also at the Trigonometrical Station immediately over the Gap on the south-east side (8889) carrying its yellow unripe and red ripe berries.

THYMELAEACEAE

Daphne composita, Gilg: Gamble, Mat., 75, p. 257: Koorders, 2, p. 657. A small shrub, found in Burma, Sumatra, the Malay Peninsula and Java. In the Peninsula it is montane, occurring in the Taiping hills, and the Main range from G. Bujong Malaka to Bukit Kutu. It was found at Fraser Hill (s.n.) in flower.

Wikstroemia candolleana, Meissn.: Gamble, Mat., 75, p. 259: *W. indica*, Mey. Koorders, 2, p. 656. A small shrub distributed in the Malay Peninsula, through Java and in Madura in an unusual way. In the Peninsula it occurs on Kedah peak, the Taiping hills, G. Tahan and G. Bubn (as a variety), the Main range from the mountains of Telom to G. Mengkuang lebar, and on Benom. At Fraser Hill it was found in flower (8932) on the poor soil of one of the vein-quartz ridges.

LORANTHACEAE.

Loranthus pentapetalus, Roxb.: Gamble, Mat., 75, p. 355: Koorders, 2, p. 158: Merrill, p. 259. A woody parasite, distributed from the eastern Himalaya through Burma and Siam to Sumatra, the Malay Peninsula, Borneo, Java and the Philippines. In the Peninsula it occurs at low levels: and the records for the mountains are few: it has, however, been collected on G. Batu puteh at 4000 ft. It was in flower at 4200 ft. at Fraser Hill (7813).

Loranthus coccineus, Jack: Gamble, Mat., 75, p. 356: Merrill, p. 236. A woody parasite, distributed from north-eastern India through Burma, in the Andaman islands, the Malay Peninsula, Banca and Borneo. In the Peninsula it is fairly general at low levels, and on the lower slopes of the mountains; but its

discovery at Fraser Hill adds greatly to the altitude at which it is known to occur. It was parasitic upon a *Maesa* and in flower (8648).

Loranthus Lobbii, Hook. f.: Gamble, Mat., 75, p. 358. A woody parasite, endemic and not uncommon in the Peninsula at low levels and up to 4000 ft. It has been collected from Kedah peak, Penang, the Taiping hills, on G. Tahan, the Main chain from Perak to G. Mengkuang lebar. It has been said to occur also in Borneo, but apparently in error. It was obtained at Fraser Hill in flower (8687).

Elytranthe formosa, Don: Gamble, Mat., 75, p. 372: Koorders, 2, p. 164. A woody parasite, distributed from Tenasserim, south through the Peninsula, and to west Java. In the Peninsula it is montane and restricted to the Main range from G. Bujong Malaka and G. Batu puteh to G. Mengkuang lebar, and also it has been obtained at Temerloh in Pahang. At Fraser Hill it was upon an undetermined tree at 4200 ft. (8925) coming into flower, and also at Pine-tree hill.

Elytranthe globosa, G. Don: Gamble, Mat., 75, p. 377: Koorders, 2, p. 164. A woody parasite on various trees, distributed from the central Himalaya through Burma, to the Malay Peninsula and to Java. In the Peninsula it is a lowland plant from the north down to Singapore, and this is its first record for the mountains. It was found at Fraser Hill (s.n.) at 4200 ft.

Lepeostegeres Kingii, Gamble, Mat., 75, p. 382. A woody parasite occurring in the Malay Peninsula and Borneo: in the north of the Peninsula montane, in the south descending to sea-level: the mountains upon which it occurs are Kedah peak, the Taiping hills, G. Tahan, the Main range from Ulu Batang Padang to Fraser Hill, Bukit Sedanan in Malacca which just attains 1000 ft., and then in southern Johore it is down near the coast. At Fraser Hill we found it exceedingly common, its very large flowers littering the paths, tattered by birds hunting honey (8692).

SANTALACEAE,

Henslowia buxifolia, Blume: Gamble, Mat., 75, p. 274: Merrill, p. 241. A woody parasite found in the Peninsula, Banca and Borneo: in the Peninsula at low elevations from Perlis and Penang to Singapore and on the mountains of Kedah peak, the Main range at Fraser Hill, Benom and Mt. Ophir. We found it in flower (7812) at 4300 ft.

Henslowia sp. A woody climber with leaves broadly elliptic, 5.5 x 3.5 cm., of the affinity of *H. Ridleyi*, Gamble, but not it, was got on a vein-quartz ridge at Fraser Hill (8923).

BALANOPHORACEAE.

Balanophora multibracteata, Fawcett: Gamble, Mat., 75, p. 397. A herbaceous parasite occurring in Sumatra and in the Malay Peninsula. In the Peninsula occurring in the Taiping hills and in the Main range from the mountains of Telom to the Semangkok pass. At Fraser Hill it is frequent and was newly in flower: it was traced to the roots of a big woody climber thought to be a Rubiaceae (7786).

EUPHORBIACEAE.

Glochidion sericeum, Hook. f., Fl. Brit. Ind. V. p. 326. Koorders, 2, p. 473: Merrill, p. 329. A shrub, distributed in Sumatra, down the Malay Peninsula, in Banca, western Java and Borneo: in the Peninsula it is a lowland plant from Perak and Penang to Singapore on both sides of the Peninsula, and ascending the mountains to some extent. At Fraser Hill it was found on a clearing at 4200 ft. (8944). This is higher than its record for Java of 3700 ft.

Glochidion coronatum, Hook. f., Fl. Brit. Ind. V. p. 326. A shrub occurring in Tenasserim and southwards to Singapore mostly at low elevations but collected along the Main range. At Fraser Hill it carried its pink fruits (8854).

Breynia coronata, Hook. f., Fl. Brit. Ind. V. p. 330. A small tree, endemic, found in Perak first at Ulu Bubong and now got at Fraser Hill in a clearing (7775).

Baccaurea bracteata, Muell.-Arg.: Hook. f., Fl. Brit. Ind. V, p. 372: Merrill, p. 330. A tree distributed in western Malaysia from Sumatra into the Malay Peninsula and to Borneo: in the Peninsula at low elevations in Perak, Pahang and Negri Sembilan: found flowerless at Fraser Hill (7883) and the identification consequently doubtful. The Malays called it Taban burong or bird's gutta-percha.

Antidesma velutinsum, Bl.: Hook. Fl. Brit. Ind. 5, p. 356. A large bush with claret fruits found between Fraser Hill and Pine-tree hill (8515) and again with flowers on G. Ulu Semangkok (8878).

Antidesma fallax, Muell.-Arg.; Hook. f., Fl. Brit. Ind. V, p. 359. A shrub 20 ft. high, endemic, occurring freely at low elevations, submontanely from Lower Siam (Kantang) to Singapore, and ascending the mountains, at any rate the Main range, whereon it has been got on G. Mengkuang lebar at 5000 ft. It occurs at Fraser Hill as a bush up to 4200 ft. (8655).

Macaranga Hullettii, King: Hook. f., Fl. Brit. Ind. V. p. 452: A very quick-growing tree, endemic, occurring down the west side of the Peninsula in swamps and swampy forest, from Perak to Malacca, and now found to be common on Fraser Hill in forest

at 4000 to 4300 ft. (8518): and what is most interesting, it regenerates itself in the one hundred feet high forest. These Fraser Hill specimens have unusually large leaves.

Macaranga puncticulata, Gage. A tree at Fraser Hill up to 50 ft. in height and on Pine-tree hill up to 15 ft. in height, is common in the forest where it is able to regenerate and was in fruit (8522, 8658).

Homalanthus populneus, Pax: Koorders, 2, 506: Merrill, p. 347. *Homalanthus populifolius*, Grah.: Hook. f., Fl. Brit. Ind. V, p. 469. A shrub, distributed from Ceylon (possibly wrong) in Sumatra, the Malay Peninsula, Java, Borneo, Celebes, the Philippines and to north Australia: in the Peninsula occurring in the lowlands from Penang to Selangor, and in Pahang including P. Tiunan. It is in the mountains of Telom: and is common at Fraser Hill, as well as in cleared mine land below it.

ULMACEAE.

Trema orientalis, Blume: Hook. f., Fl. Brit. Ind. 5, p. 484; Koorders, 2, p. 77: Merrill, p. 217. A small tree, widely distributed from India both north and south and from China to Sumatra, the Malay Peninsula, Java, Borneo, and other islands of Malaysia and to Australia and the Pacific, quick to take advantage of the clearings of man, and in the Peninsula wide. At Fraser Hill it occurred near the houses, both in the type (s.n.), and (8632) in the variety *amboinensis*. (*T. amboinensis*, Blume: Hook. f., Fl. Brit. Ind. 5, p. 484).

MORACEAE.*

Ficus rostrata, Lamk.: Hook. f., Fl. Brit. Ind. 5, p. 520: Koorders, 2, p. 110: Merrill, p. 227. A small shrub, distributed from the eastern Himalaya through Burma to the Malay Peninsula, Borneo, Java: and found at Fraser Hill in exposed places, carrying small bright red figs (8599).

Ficus pedunculosa, Miq., reaching ten feet in height with reddish figs (8802) at Fraser Hill.

Ficus diversifolia, Blume: Hook. f., Fl. Brit. Ind. 5, p. 529: Koorders, 2, p. 116: Merrill, p. 529. A small bush distributed from Sumatra through the Peninsula to Borneo, and Java: in the Peninsula it occurs from low levels up to 5000 ft. and it was found at Fraser Hill as a bush up to 10 ft. high in fruit (8920, 8654).

Ficus Burkillii, Ridl. n. sp. A bush with acute leaves, but otherwise near to *F. diversifolia*, at Fraser Hill (8900) and at Pine-tree hill (8529).

Ficus fistulosa, Reinw.: Hook. Fl. Brit. Ind., 5, p. 525: Koorders, 2, p. 120: Merrill, p. 223. A small tree growing in a gully at Fraser Hill in fruit, and with hollowed stems (8886).

*In cosequence of the genus **Ficus** being under revision in Calcutta and the collection belonging to the Singapore Herbarium being on loan the Fraser Hill species cannot be determined fully.

Ficus patens, Ridl., a coarse hairy bush occurring at Fraser Hill in the valley (7776).

Ficus sp. A stiff pubescent bush, with bright red fruits, at Fraser Hill (s.n.).

Ficus fulva, Reinw.: Hook. Fl. Brit. Ind., 5, p. 531: Koorders, 2, p. 117: Merrill, p. 223. A coarse small tree about 20 ft. high with orange to livid figs, in the mined lands of the upper Tras valley about 3500 ft. (7864).

Ficus globosa, Bl.: Hook. Fl. Brit. Ind., 5, p. 503: Koorders, 2, p. 103: Merrill, p. 224. A small tree with big figs, found in the mine area of the upper Tras valley (7872).

Ficus chartacea, Wall.: Hook. Fl. Brit. Ind., 5, p. 533. A bush eight feet high with orange-red figs upon upright branches, at Fraser Hill (7789).

Ficus sp. A pyramidal bush six feet high with brown fruits (8555).

Conocephalus suaveolens, Blume: Hook. f., Fl. Brit. Ind., 5, p. 545: Koorders, 2, p. 122: Merrill, p. 229. A big woody climber, distributed from the eastern Himalaya and Indo-China southwards to Sumatra, the Malay Peninsula, Java, Borneo, and the Philippines: in the Peninsula common widely. At Fraser Hill plentiful.

URTICACEAE.

Pouzolzia viminea, Wedd. Hook. Fl. Brit. Ind., 5, p. 581: Koorders, 2, p. 144: Merrill, p. 233. Shrub about 8 ft. high upon a clearing at 4200 ft. (8948).

JUGLANDACEAE.

Engelhardtia spicata, Blume: Hook. f., Fl. Brit. Ind. V, p. 595: Koorders, 2, p. 51: Merrill, p. 210. A tree, distributed from the central Himalaya, south through Indo-China into the Malay Peninsula, Java, Borneo and to the Philippines. In the Peninsula it is only on the Main range of Perak. At Fraser Hill it is frequent and so also on G. Ulu Semangkok. Ripe fruits were falling.

FAGACEAE.

Quercus sp. near *Q. semiserrata*. Roxb., collected flowerless, a tree about 50 ft. high upon a north slope at Fraser Hill (7753).

Quercus turbinata, Blume: Gamble, Mat., 75, p. 410: Koorders, 2, p. 60. A tree, occurring in Sumatra and in the Malay Peninsula: in the Peninsula found in Penang and on the Main range in Ulu Batang-padang and now at Fraser Hill (8661). It should be collected more for a better understanding.

Quercus cyrtorhyncha, Miq.: Merrill, p. 212: *Pasania cyrtorhyncha*, Gamble, Mat., 75, p. 432. A tree, distributed from Sumatra through the Malay Peninsula and Borneo to Mindanao in the Philippines. In the Peninsula occurring submontanely from

Perak southwards, and to Singapore. At Fraser Hill and below towards the Gap, an oak without flowers and without fruit was found which appears as if this (7783, 7836).

Quercus rassa, Miq.: Koorders, 2, p. 59: Merrill, p. 215: *Pasania Rassa*, Gamble, Mat., 75, p. 436. A tree distributed in western Malaysia from Sumatra, the Malay Peninsula, to west Java and to Borneo. In the Peninsula montane, occurring on Penang, on the Taiping hills, on G. Tahan, on the Main range from Fraser Hill into Negri Sembilan, on Benom, and then at low levels in southern Johore. It reaches 6000 ft. on G. Tahan. At Fraser hill it is common tree (s.n.).

Quercus lucida, Roxb.: *Pasania lucida*, Gamble, Mat., 75, p. 440. A tree, endemic, very common in Penang and extending thence southwards to Singapore, ascending the mountains and recorded as upon G. Batu puteh at 3000 ft. It occurred at Fraser Hill on the ridges, but as the acorns were fallen ones not attached to the parent, there is a trifle of doubt as to the determination (s.n.).

Quercus encleisacarpa, Korth.: *Pasania encleisacarpa*, Gamble, Mat., 75, p. 449. A tree with a wide top and brittle wood, occurring in Sumatra and in the Malay Peninsula: in the Peninsula it occurs at low levels from Penang and Province Wellesley to Singapore. At Fraser Hill it was common in the variety *aperta* (8695).

Quercus beccariana, Benth: Merrill, p. 211: *Pasania beccariana*, Gamble, Mat., 75, p. 453. A tree, with brittle wood, occurring in the Malay Peninsula and in Borneo: in the Peninsula it is said once to have been abundant in Singapore, and it is recorded for Penang. The Fraser Hill specimens have depressed globose acorns (7795) and consequently the identification is somewhat doubtful.

Quercus sp. with very large acorns and cupules covered with processes as in *Q. Wrayi*, found at Fraser Hill (s.n.).

Quercus sp. A tree which was neither in fruit nor in flower (8805).

TAXACEAE.

Dacrydium Beccarii, Parl.: Merrill, p. 30. A small tree occurring in the Malay Peninsula and in Borneo. In the Peninsula it occurs on G. Tahan, on the Main range from G. Bujong Malaka to Pine-tree hill near Fraser Hill (8536), and on Mt. Ophir. On Pine-tree hill it occurs about and on the very top as a tree of 20 ft.

Dacrydium elatum, Wall.: Hook. f., Fl. Brit. Ind., 5, p. 648: Merrill, p. 30. A lofty tree, occurring from Burma and Tonkin to Sumatra, down the Malay Peninsula, in Borneo, the Philippines and in Fiji: in the Peninsula occurring in Penang, on Kedah peak at 3000 ft., on G. Tahan on the Main range in the mountains of Telom, on Mt. Ophir, and on G. Chenik in Pahang. Under Fraser

Hill at about 3400 ft. it occurred as a magnificent tree with a clean straight bole of eighty feet to the first branch, and a total height of one hundred feet and more: it was found also upon G. Ulu Semangkok.

Dacrydium falciforme, Pilger: Merrill, p. 30. A tree, distributed from the Malay Peninsula, in Lingga, through north Borneo to Mindoro in the Philippine islands: in the Peninsula occurring on G. Tahan, and on the Main range in the neighbourhood of the Semangkok pass. It is a most common tree on the vein-quartz ridges of Fraser Hill (8556, 8929), and also elsewhere sometimes sparingly, sometimes in some measure of plenty: ascending above the level of Fraser Hill towards Pine-tree hill: below Fraser Hill it occurs down to 3300 ft. at least and it is on G. Ulu Semangkok. Regeneration appears to be quite free. The Malays call it Kahuwa.

Podocarpus neriifolia, Don.: Hook. f., Fl. Brit. Ind., 5, p. 649: Koorders, 1, p. 65: Merrill, p. 31. A tree, distributed from the Central Himalaya and southern China, to Sumatra, the Malay Peninsula, Borneo, Java, Celebes, the Moluccas, Philippines and to New Guinea. In the Peninsula it occurs as a montane plant in Perang, on G. Tahan as a variety or subspecies, on the Main range from Perak south to Bukit Etam, and on Mt. Ophir. In Java it descends as low as 1200 ft.: but in Penang it exists lower than this. At Fraser Hill it is by no means uncommon (7841, 7856, 8877).

Agathis alba, Foxw.: Koorders, 1, p. 67: Merrill, p. 32: *A. loranthifolia*, Salisb.: Pook. f., Fl. Brit. Ind. 5, p. 650. A lofty tree, distributed in Cochin-china and through the interior of Malaysia, in Sumatra, the Malay Peninsula, Borneo, Java, Celebes, the Moluccas, and the Philippines: in the Peninsula on Kedah peak, in Penang, where it is becoming very scarce, on the Taiping hills, on G. Tahan, on the Main range from near the Semangkok pass, and on G. Chenik in Pahang. Under Fraser Hill it was observed no higher than 3300 ft. upon the west side of the waterparting.

BURMANNIACEAE.

Burmattia longifolia, Becc.: Ridl., Mat., Mono., 2, p. 70: Merrill, p. 133. A herb of mossy places, occurring in the Malay Peninsula and through Borneo to the Philippines and New Guinea: in the Peninsula it occurs on the Taiping hills, on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom to Bukit Etam and on Benom. At Fraser Hill it occurs sporadic, but quite plentifully and was going into fruit (8510): it was also found on G. Ulu Semangkok.

ORCHIDACEAE.

Oberonia pendula, Ridl. in Jour. Str. Br. Roy. As. Soc., 61, p. 38. An epiphyte, endemic and local. It was collected from the neighbourhood of Fraser Hill by Mr. Ridley in 1911 where we got it (7825) in flower and in fruit.

Oberonia spathulata, Lindl. J. J. Smith. p. 238. Distribution in Java, Sumatra, Borneo; occurring as an epiphyte at Fraser Hill (8634).

Liparis compressa, Lindl.: Ridl., Mat., Mono., 1. p. 25: J. J. Smith, p. 280: Ames. p. 153. A herbaceous plant, distributed from Sumatra, in the Malay Peninsula, Borneo, Java Celebes and the Philippines: in the Peninsula occurring in the Taiping hills, and on the Main range from G. Batu puteh to Fraser Hill, where it was found in flower (8893).

Liparis purpureoviridis, Ridl. n. sp. A not uncommon terrestrial plant in the forest (8422) with green purple-veined flowers.

Platyclinis odorata, Ridl., Mat., Mono., 1. p. 28. An epiphyte or on rocks, endemic, occurring on G. Bubu, and on the Main range about Fraser Hill on trees (8423) and below in the upper Tras valley at 3500 ft. on rocks in the sun (8853), plentiful and just in flower.

Dendrobium Kelsalii, Ridl., Mat., Mono., 1. p. 36. A herbaceous epiphyte, endemic, occurring on Kedah peak, apparently in Penang, on the Taiping hills, on G. Tahan, on the Main range from Fraser Hill (8690) to Bukit Etam, on Benom and on Mt. Ophir also on P. Aor off the east coast.

Dendrobium flabellum, Reichb. f.: Ridl., Mat., Mono., 1. p. 36. J. J. Smith, p. 315: Ames p. 189. A herbaceous epiphyte, distributed from Siam to Singapore, in Java and in Borneo, but in need of further study, as being apparently a species in process of breaking up. It is an orchid with flowers that are open for a few hours only in accurate response to some climatic phenomenon: and it is evident that an acceleration or retardation of the rapidity with which the stage between the stimulus and the flowering is passed through, stands for the production of new species as intercrossing is prevented. This seems to be happening: and there seem to be in the Peninsula three subspecies of *D. flabellum*. (1) the plant of Singapore and southern Johore with cream-coloured flowers, the sepals and petals marked with pink spots, the lip cream-coloured with rosy side-lobes (2) the plant of the north with pale green flowers, the sepals and petals spotted with purple, the lip wholly cream and (3) the Fraser Hill plant with the sepals and petals cream-coloured suffused with purple and the lip with the mid-lobe orange. Both the second and the third appeared to have smaller flowers than the first.

Dendrobium atrorubens, Ridl. Mat., Mono. 1, p. 41. A herbaceous epiphyte with a dull cherry-red flower, endemic, found in the Peninsula on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range at Fraser Hill (8672) and on Benom.

Dendrobium hymenopterum, Hook. f.: Ridl. Mat., Mono. 1. p. 52. A herbaceous epiphyte, endemic, on G. Raya in Lankawi, on Kedah peak, on G. Tahan, on the Main range from G. Batu puteh and G. Bujong Malaka to Fraser Hill (8502) and on Benom. It was abundantly in flower.

Dendrobium albicolor, Ridl. in Jour. Linn. Soc. Bot. 32, p. 250. A herbaceous epiphyte, known from Lower Siam (Pungah) and now in a pinkish variety from Fraser Hill (7790).

Dendrobium rupicolum, Ridl. in Jour. F. M. S. Mus. 1, p. 184. A small herbaceous epiphyte, occurring on G. Tahan, on the Main range at Fraser Hill (8516) and southwards on Bukit Etam, and on Benom. It was found in flower.

Dendrobium sp. apparently new, a herbaceous wide creeping hirsute epiphyte of a peculiar appearance (7799).

Dendrobium geminatum, Hook. f.: Ridl. Mat., 1, p. 35: J. J. Smith, 346. An epiphyte and on rocks occurring in the Malay Peninsula and in Java: in the Peninsula found on Kedah peak and on the Taiping hills, on G. Tahan, and on the Main range from Ulu Batu Padang to Fraser Hill (7876). Its flowers are of a dull yellow, marked with purple.

Bulbophyllum patens, Hook. f.: Ridl. Mat., Mono. 1, p. 62. A herbaceous epiphyte, endemic, which may be represented by our no. 7792, which was found in fruit upon an oak at Fraser Hill. Until flowers are forthcoming however its occurrence must be doubtful. *B. patens* is in the Peninsula, at low levels from Penang to Singapore.

Bulbophyllum uniflorum, Hassk.: J. J. Smith, p. 443: *B. galbinum*, Ridl.: Mat., Mono. 1, p. 64. A herbaceous epiphyte, in Sumatra, the Malay Peninsula and west Java: in the Peninsula found in the Taiping hills, on G. Tahan at 3300 ft. and on the Main range from the neighbourhood of the Semangkok pass to Bukit Etam: it was found at Fraser Hill in flower (8504).

Bulbophyllum capitatum, Lindl.: Ridl. Mat., 1, p. 73: J. J. Smith, p. 437. Ames, p. 184. A herbaceous epiphyte occurring in Sumatra, in the Malay Peninsula, Borneo and west Java where it is common, being found both at high and low elevations. In the Peninsula it is recorded from Penang, the Taiping hills, G. Tahan, the Main chain from the mountains of Telom to G. Mengkuang lebar, on Benom and on the 1000-feet-high hills near Batu Pahat in Johore. It was found at Fraser Hill (8810) carrying its flame-coloured or yellow flowers.

Bulbophyllum montigenum, Ridl. Mat., 1, p. 76: Ames, p. 188. A herbaceous epiphyte of the Peninsula and Borneo: in the Peninsula hitherto recorded only from Benom, and now recorded also from the Main chain at Fraser Hill (8417), where it was obtained carrying its green flowers.

Bulbophyllum pedicellatum, Ridl. in Jour. Linn. Soc. Bot., 31, p. 278. A herbaceous epiphyte, endemic, occurring in Lower Siam at Poongah and at Khasum, and now found on the Main range at Fraser Hill (7891) coming into flower.

Bulbophyllum minutulum, Ridl. n. sp., a small running herbaceous epiphyte, with straw coloured flowers, found at Fraser Hill (7797).

Bulbophyllum nematocaulon, Ridl. n. sp., a small running herbaceous epiphyte with pale green flowers, found at Fraser Hill (8955).

Bulbophyllum sp, apparently a new species, a small running herbaceous epiphyte near *B. tineae*, Ridl., but differing in having slightly smaller flowers and narrower leaves (8676).

Bulbophyllum sp. Apparently a new species (7822).

Ceratostylis gracilis, Blume: Ridl. Mat., Mono. 1, p. 109: J. J. Smith, p. 300. A small herbaceous epiphyte found in the Malay Peninsula and in west Java: in the Peninsula it occurs on Kedah peak, on Bukit Seraya which adjoins Bukit Mertajam in Province Wellesley, on the Taiping hills and G. Bubu, on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom to G. Angsi; and then down upon the coast in southern Johore. At Fraser Hill it is probably the commonest of all orchids (8449, 8517). The figure in the *Icones Plantarum*, 2098, was drawn from an immature flower, and the spur should be twice as long.

Ceratostylis clathrata, Hook. f.: Ridl., Mat., Mono., 1, p. 111. A small peculiarly tough epiphyte, endemic occurring on the Main range from Ulu Batang Badang to Fraser Hill (7800) and also on Benom.

Calanthe angustifolia, Lindl.: Ridl. Mat., Mono. 1, p. 121: J. J. Smith, p. 205. A terrestrial herb of forests found in Sumatra, the Malay Peninsula and in west Java: found in the Peninsula on Kedah peak, on the Taiping hills, on the Main range from the mountains of Telom to the Semangkok pass and on Benom. At Fraser Hill it occurs sporadic upon the crests of the ridges (8525), and was newly in flower. It was found higher than Fraser Hill towards Pine-tree hill, and in the other direction on G. Ulu Semangkok.

Eria latifolia, J. J. Smith, p. 394: *E. iridifolia*, Hook. f.: Ridl. Mat., Mono. 1, p. 90. A herbaceous epiphyte, in Sumatra, the Malay Peninsula and Java: in the Peninsula found only upon the Main range from G. Bujong Malaka and G. Batu puteh to Fraser Hill (7830), in flower.

Eria major, Ridl. Mat., 1, p. 90: Merrill, p. 172. A herbaceous epiphyte distributed from the Malay Peninsula through Borneo to the Philippines. There are two varieties of it at Fraser Hill one with short leaves (8402) and the other with long leaves (s.n.). The short leaved variety occurs in the Taiping hills. The long-leaved variety occurs there also, and on the Main range from G. Kerbau to the Semangkok pass, and also on Benom. They were obtained in flower, and from Fraser Hill extended towards Pine tree hill.

Eria longifolia, Hook. f.: Ridl. Mat., 1, p. 91. A herbaceous epiphyte, montane, found in Sumatra, in the Taiping hills, on G. Tahan, and on the Main range from the mountains of Telom to the Semangkok pass, and also it is on Benom. It is very common at Fraser Hill (8419), and carried its snow-white flowers.

Eria pilifera, Ridl. Mat., Mono., 1, p. 92. A herbaceous epiphyte, in Sumatra, and in the Peninsula before this known only from the Taiping hills, found on the Main range at Fraser Hill (7871), in flower.

Eria pauciflora, Blume: J. J. Smith, p. 381: *E. monticola*, Hook. f.: Ridl. Mat. Mono., 1, p. 95. A herbaceous epiphyte, distributed in west Java and the Malay Peninsula: occurring on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range from Fraser Hill to Bukit Etam, and on Mt. Ophir; then again on P. Aor off the east coast. At Fraser Hill it is very abundant (8416, 8638) and it was found also on G. Ulu Semangkok (8881) in flower everywhere.

Eria floribunda, Lindl.: Ridl. Mat. Mono., 1, p. 96: J. J. Smith, p. 400: Merrill, p. 170. A herbaceous epiphyte, distributed from Tenasserim to the Malay Peninsula in Sumatra, Borneo and through Java. In the Peninsula it occurs in Lower Siam, and down the west coast to Singapore; then again it is on the mountains *e.g.* Kedah peak, the Taiping hills, G. Tahan, and the Main range at Fraser Hill (8406) where it attains twice the size of mangrove-swamp examples.

Eria teretifolia, Griff.: Ridl. Mat. Mono., 1, p. 100: Merrill, p. 174. A herbaceous epiphyte, found in the Malay Peninsula and Borneo: in the Peninsula montane, occurring on Kedah peak, in Penang, on the Taiping hills, on G. Tahan, on the Main range from G. Batu puteh and in the mountains of Telom to G. Tampin, and on Mt. Ophir. At Fraser Hill it is very plentiful (7844, 8595), and was in flower.

Phreatia crassifolia, Ridl. in Jour. F. M. S. Mus., 4, p. 69. A very small epiphyte which is endemic and montane, and has been obtained on the Taiping hills, and on the Main range in the mountains of Telom, and now at Fraser Hill where it was upon a *Quercus* (7798) in flower.

Spathoglottis plicata, Blume: Ridl., Mat., Mono., 1, p. 117: J. J. Smith, p. 219: Merrill, p. 182. A terrestrial herb, distributed from Sumatra, the Malay Peninsula, Java, Borneo, Celebes, the Moluccas to the Philippines, New Guinea, the Solomon islands and Samoa: in the Peninsula it occurs from Tomoh in Lower Siam down to Singapore at low levels and ascends the mountains somewhat. But Fraser Hill in the valley at 4,000 ft. (7778), the neighbourhood of Fraser Hill at 3,500 ft. towards the Gap, and 3,600 ft. in the upper Tras valley are greater altitudes than others have recorded: however it occurs high in Java. The Fraser Hill plant has the small lip usual in the Peninsula.

Spathoglottis aurea, Lindl.: Ridl., Mat., Mono., 1, p. 118: J. J. Smith, p. 218: Merrill, p. 182. A terrestrial herb, distributed in Sumatra, the Malay Peninsula, Borneo, west and mid Java and the Philippines: in the Peninsula it is montane and occurs on Kedah peak, on the Taiping hills, on G. Tahan, on the Main range.

from G. Kerbau, G. Batu Puteh to Bukit Etam, and on Mt. Ophir. At Fraser hill it was collected on the face of a landslide (7771), which occurrences are apparently the means by which it persists.

Phaius callosus, Lindl.: Ridl. Mat., Mono., 1, p. 119: J. J. Smith, p. 196. A terrestrial herb of forests by water, found in the Malay Peninsula and in west Java: occurring in the Peninsula on the Taiping hills and on the Main range at Fraser Hill (7820), in flower.

Agrostophyllum callosum, Reichb. f.: Ridl., Mat., Mono., 1, p. 108. A herb of rocks or an epiphyte distributed from the central Himalaya through Burma to the Malay Peninsula, montane; occurring in the Peninsula on Kedah peak, and in the Main range from near Fraser Hill to Bukit Etam. Under Fraser Hill it was found in the old mines of the upper Tras valley (7877), in fruit.

Agrostophyllum bicuspidatum, J. J. Sm.: *Podochilus callosa*, Schlechter: Ridl. Mat. Mono., 1, p. 197: J. J. Smith, p. 286: Ames, p. 76. A herbaceous orchid of mossy places, distributed from Tenasserim, in Sumatra, the Malay Peninsula, Java, Borneo and Celebes; in the Peninsula montane in the north, as on Penang hills, on the Taiping hills, on G. Tahan, on the Main range from the mountains of Telom to Bukit Sutu in Negri-Sembilan, and on Mt. Ophir: then at low levels in Johore and Singapore. It was collected near Pine-tree hill (8523) in flower.

Ceratostylis cryptantha, Ridl. Mat. Mono., 1, p. 110. A small epiphyte, endemic, occurring in Penang, on the Taiping hills, and the Main range near the Semangkok pass. The plant collected by us is larger (8511), and constitutes a variety.

Coelogyne carnea, Hook. f.: Ridl. Mat. Mono., 1, p. 134. A herbaceous epiphyte, endemic, occurring in the Taiping hills, on G. Tahan, and on the Main range from G. Kerbau and the mountains of Telom to G. Mengkuang lebar and also on Benom. At Fraser Hill it is abundant (8501, 8626), and up to Pine tree hill (8644), and also upon G. Ulu Semangkok.

Coelogyne speciosa, Lindl.: Ridl. Mat. Mono., 1, p. 132: J. J. Smith, p. 138: Ames, p. 145. An epiphytic herb, distributed from Sumatra to the Malay Peninsula, to Borneo and through Java: in the Peninsula occurring on Western hill, Penang, on the Taiping Hills, on G. Tahan, on the Main range from the mountains of Telom to the Semangkok pass, and then almost at sea-level in the island of Singapore and in southern Johore. It occurs in Java also at low levels, as well as high. It was found at Fraser Hill not uncommonly (8512).

Renanthera matutina, Lindl.: Ridl. Mat. Mono., 1, p. 156: J. J. Smith, p. 587. A tough epiphyte, but able to use stoney ground under the trees, occurring in Sumatra, the Malay Peninsula and in Java: in the Peninsula found on the Main range from the mountains of Telom to the neighbourhood of the Semangkok pass. At Fraser Hill it was found on a vein-quartz ridge (8938) in flower.

Saccolabium bigibbum, Ridl. in Mat., 1, p. 164, but not of Hook. f. A herbaceous epiphyte endemic and montane found on the Taiping hills, on G. Tahan, on the Main range at Fraser Hill (8503) and on Benom. This orchid wants a new name. It was in flower.

Appendicula, apparently a new species, found as a rigidly erect plant of a bronze colour upon the ground in the mined area of the upper Tras valley at about 3600 ft. (8856).

Anoectochilus Reinwardtii, Blume: Ridl. Mat. Mono., 1, p. 312: J. J. Smith, p. 96. A terrestrial herb of the floor of the forest, distributed in Sumatra, the Malay Peninsula, in west Java and Amboyna: in the Peninsula found on Kedah peak, on the Taiping hills, and on the Main range from the mountains of Telom to Fraser Hill (8550, 8621).

Anoectochilus sp. An orchid with the habit of the last, apparently undescribed. It was collected at Fraser Hill (7803) and has been collected by Napier at the Semangkok pass.

Cryptostylis arachnites, Blume: Ridl. Mat. Mono., 1, p. 225: J. J. Smith, p. 59: Ames, p. 139. A terrestrial herb, of wide distribution, in Ceylon, in the hills of Assam and down south in the Malay Peninsula, Borneo, Java and the Philippines: in the Peninsula it occurs on Kedah peak, in Penang, on the Taiping hills, on G. Tahan, and on the Main range from G. Batu puteh to Bukit Etam; then southwards at low levels from Malacca to Singapore. At Fraser Hill it was found towards Pine-tree hill (8506), in fruit.

ZINGIBERACEAE.

Globba aurantiaca, Miq.: Ridl. Mat. Mono., 2, p. 7: Merrill, p. 123. A herb, distributed through the interior of western Malaysia, Sumatra, the Malay Peninsula and Borneo: in the Peninsula it occurs in Penang from 1000 ft. upwards, on the Taiping hills, on the Main range from Fraser Hill to G. Tampin and under it on the west side: then in the south of the Peninsula at low levels to the Straits of Johore. At Fraser Hill it is not uncommon (8429).

Globba cernua, Baker: Ridl. Mat. Mono., 2, p. 8. A herb, endemic and montane, occurring in the south of Lower Siam, on the Taiping hills, on the Main range from the mountains of Telom and G. Kerbau to G. Angsi. It was found in flower between Fraser Hill and Pine-tree hill (8431).

Camptandra ovata, Ridl. Mat. Mono., 2, p. 12. A small herb of the floor of the forest, endemic, and confined to the Main range from G. Kerbau to G. Mengkuang lebar. It is common at Fraser Hill (8639) and its pure white flowers open in the late afternoon, closing again before dawn.

Hedychium malayanum, Ridl. n. sp. A herb, undescribed, which was collected first a couple of years ago by Mrs. Ferguson-Davie at Fraser Hill, and was obtained by us in the upper Tras valley under Fraser Hill (7875) in an area which had been mined.

Amomum ochreum, Ridl. Mat. Mono., 2, p. 32. A herb, endemic, found upon the Main range in the upper Tras valley under Fraser Hill (8862) upon a mine area at 3300 ft. at Ginting Bidai west of Kuala Lumpur, and on Bukit Galing near Kuantan. It was in flower.

Hornstedtia grandis, Ridl. Mat., 2, p. 36. A giant herb, 20 feet high, endemic, occurring in the Taiping hills, and on the Main range from the mountains of Telom to Fraser Hill (8584). There is just so much doubt about this identification as is due to the want of corollas, as the flowers were all over.

Zingiber spectabile, Griff.: Ridl. Mat., 2, p. 26. A herb, found in Sumatra and the Malay Peninsula, occurring in the Peninsula in the lowlands all down the west side from Perlis and Penang to Malacca, and lately found in north-eastern Pahang. It has not been obtained before this as high in the mountains as Fraser Hill (8666). It is used by the Malays locally as a flavouring, calling it Tepus tundok or nodding ginger.

Zingiber gracile, Jack: Ridl. Mat. Mono., 2, p. 29. A herb, more or less montane in the north of the Peninsula, where it occurs in Penang, on the Taiping hills, on G. Tahan, and on the Main range from Fraser Hill to G. Tampin and on Mt. Ophir: it occurs down to the foot of the hills, and southwards on G. Pulai and in Singapore island. It is not uncommon about Fraser Hill, with yellow bracts when in flower (8806) and these redden in fruit-ripening (8633).

Zingiber Griffithii, Baker: Ridl. Mat. Mono., 2, p. 29. A herb, endemic, occurring in the low country from Penang to Singapore, and on the lower slopes of the hills. Its occurrence at Fraser Hill (8808) adds greatly to its recorded spread upwards. It was found in fruit, with reddish magenta bracts.

Alpinia Murdochii, Ridl. Mat. Mono., 2, p. 50. A herb, endemic, occurring on G. Tahan, and on the Main range in the neighbourhood of the Semangkok pass. At Fraser Hill it was found in flower (8671), and between the Gap and G. Ulu Semangkok it was found in fruit (8868).

Alpinia petiolata, Baker; Ridl. Mat. Mono., 2, p. 53. A herb, endemic, distributed in the Peninsula in the Taiping hills, on G. Tahan, and on the Main range from G. Horan and Fraser Hill to G. Tampin. At Fraser Hill it is very common, but was only rarely in flower or in fruit (8434, 8596).

Geostachys secunda, Ridl. Mat. Mono., 2, p. 44. A herb, endemic, found on the Main range from G. Bujong Malaka to the Semangkok pass; very common at Fraser Hill (8636) and in flower. This species is replaced by very closely allied species upon other ranges on the Peninsula.

MUSACEAE.

Musa violascens, Ridl. Mat. Mono., 2, p. 64: Merrill, 120. A giant herb, distributed in Sumatra, the Malay Peninsula and in Borneo: in the Peninsula common at low elevations down both

sides and ascending the mountains to about 4000 ft. At Fraser Hill it is very common (8598). It is called Pisang toh.

Musa malaccensis, Ridl. Mat. Mono., 2, p. 63: A giant herb, endemic, and rather larger than the last, also a little more of a woodland plant, endemic, occurring in the Peninsula commonly in hill lands down both sides from Pulau Adang, Kedah and Kuantan southwards. It is very common at Fraser Hill and carried flowers and fruit (8858). It is called Pisang jahit or thread plantain.

AMARYLLIDACEAE.

Curculigo latifolia, Dryand.: Ridl. Mat. Mono., 2, p. 66. Merrill, p. 117. A herb found in Burma, the Andamans, the Malay Peninsula and Borneo: in the Peninsula it occurs all down both sides to Singapore: it occurs also on G. Kerbau and in the mountains of Telom and southwards along the Main range to G. Angsi. It is not uncommon at Fraser Hill (s.n.).

TACCACEAE.

Tacca cristata. Jack: Ridl. Mat. Mono., 2, p. 77. A herb distributed from Tenasserim to Sumatra and the Malay Peninsula, in the Peninsula occurring in the low country down to Singapore, but it has not been collected from the low country on the east side: it occurs in the mountains of Telom and doubtless in the mountains elsewhere. Under Fraser Hill it was found towards the Gap at 3500 ft. in flower (7765). The hill plants are larger than the plains plants.

DIOSCOREACEAE.

Dioscorea laurifolia, Wall.: Ridl. in Mat. Mono., 2, p. 83. A herbaceous climber, endemic occurring in the Peninsula from Penang to Singapore, preferring the tops of hills, but also descending to sea-level in well-drained places. At Fraser Hill it is very common following clearing, and not rare in the undisturbed forest; its pleasantly scented flower-spikes were to be seen in great abundance (8401, 8433).

Dioscorea sp. with the appearance of *D. pyrifolia*, Kunth, but with large tubers that carry a brown tanning or tinctorial substance and called therefore Gadong Sanak by the Malays who make some use of them. This *Dioscorea* reaches 4000 ft. at Fraser Hill but is somewhat more easily found in hollows by water at lower levels both towards the Gap and in the upper Tras valley, where it bore flowers (7860, 7889, 8432, 8945).

LILIACEAE.

Smilax calophylla, Wall.: Ridl. Mat., 2, p. 102. A climber, endemic, a montane species in the north of the Peninsula, occurring on Kedah peak, on the Taiping hills, from 1000 to 1500 ft., on G. Tahan, on the Main range about the Semangkok pass, and to G. Menekwang lebar, on Benom and on Mt. Ophir, then in the lowlands of Johore and Singapore. It was observed to be not uncommon on G. Ulu Semangkok, and down to the Gap (8867).

Smilax laevis, Wall.: Ridl. Mat. Mono., 2, p. 103: Merrill, p. 116. A climber occurring in China and down to the Malay Peninsula, and Borneo: in the Peninsula montane occurring on Kedah peak, in Penang, on the Taiping hills, on G. Keledang near Ipoh, on the Main range from the mountains of Telom to G. Mengkuang lebar, and on Mt. Ophir. At Fraser Hill it was in fruit (8578).

COMMELINACEAE.

Commelina nudiflora, Linn.: Ridl. Mat. Mono., 2, p. 115: Koorders, 1, p. 277: Merrill p. 112. A pantropic herb, which grows freely at the Gap but appears not to have ascended yet further in the direction of Fraser Hill (s.n.).

Forrestia gracilis, Ridl. Mat. Mono., 2, p. 123. A herb, endemic, a lowland plant occurring from Kedah and Pahang to Singapore. It is not uncommon at Fraser Hill up to 4200 ft. (8869) and in fruit.

PALMAE.

Nenga macrocarpa, Scortechini: Ridl. Mat., 2, p. 145. A palm of moderate size, endemic and in the north of the Peninsula montane occurring on Koh Gah in Lower Siam, on Kedah peak, in Penang upon the very tops of the hills, on the Taiping hills, on G. Tahan and under it, on the Main range from G. Bujong Malaka to G. Tampin, on G. Keledang over Ipoh, on G. Pantai and also in Johore down to sea level. At Fraser Hill by no means uncommon (8609).

Pinanga Scortechinii, Becc.: Ridl. Mat. Mono., 2, p. 138. A palm of about 10 ft. in height, endemic and montane: it occurs in Penang, on the Taiping hills, on Bukit Kapayang near Sungei Siput, on G. Tahan, on the Main range from G. Kerbau and the mountains of Telom to Negri Sembilan; then down at the coast in southern Johore. It occurs freely at Fraser Hill and carries its cherry-red fruits (7885).

Pinanga polymorpha, Becc.: Ridl. Mat. Mono., 2, p. 138. A rather small palm, endemic, and montane, occurring on the Taiping hills, and on the Main range from the mountains of Telom to Bukit Etam. It is plentiful at Fraser Hill (8592, 8617); and with fruit ripening the peduncle becomes a brilliant scarlet.

Pinanga paradoxa, Scheff.: Ridl. Mat. Mono., 2, p. 141. An endemic palm, montane and submontane, occurring on Kedah peak, on the Taiping hills, on the Main range from G. Batu puteh to G. Anosi, on Mt. Ophir and on G. Pantai. It is common at Fraser Hill and the peduncle, which goes a brilliant red as the fruit ripens, makes it conspicuous (8618).

Caryota obtusa, Griff. Ridl. Mat. Mono., 2, p. 157. A beautiful tall palm, endemic in the Peninsula on the Taiping hills, the Main range from G. Batu puteh to the neighbourhood of Kuala Lumpur, and on G. Pantai in Johore. At Fraser Hill it occurs in hollows certainly up to 4200 ft.; and about 3300 ft. some very fine examples were seen.

Licuala pusilla, Becc.: Ridl. Mat. Mono., 2, p. 164. A small palm, endemic, occurring on the Taiping hills, on G. Tahan and on the Main range about Ulu Bubong and the Semangkok pass. At Fraser Hill it is very common (7842, 8426) it was in flower and in fruit, and produced stems attaining 2 ft.

Calamus javensis, Blume: Koorders, 1, p. 234: Merrill, p. 75: *C. penicillatus*, Roxb.: Ridl. Mat. Mono., 2, p. 191. A rattan distributed in Sumatra, the Malay Peninsula, Borneo and west and mid Java: in the Peninsula it is montane in the north, on G. Raya in Lankawi, Penang, the Taiping hills, the Main range from G. Batu puteh and the mountains of Telom to G. Angsi, and southwards both on hills and down to sea level in Singapore island. At Fraser Hill it seems uncommon: it occurs (7814) in the variety *peninsularis*, which is characteristic of the Peninsula.

Calamus luridus, Becc.: Ridl. Mat. Mono., 2, p. 198: Merrill, p. 75. A rattan of about 25 ft. in length occurring in the Malay Peninsula and in Borneo: in the Peninsula it is usually found at low levels from Taiping to Singapore. At Fraser Hill it was collected as no. 8807: but there is just a little doubt in regard to the determination. The Malays with us called it Rotan lilin or wax rattan.

Calamus perakensis, Becc.: Ridl. Mat. Mono., 2, p. 202. A rattan about 20 ft. long, which is endemic, and (including part of *C. lanata*, Ridl. in it) has the following distribution:—Bukit Kapayang near Sungei Siput, and the Main range from the mountains of Telom to Bukit Etam. It was found at Fraser Hill in flower (7757) and in fruit (8421).

Calamus distichus, Ridl. Mat. Mono., 2, p. 206. A rattan of about 15 ft. in length, endemic and local: at Fraser Hill not uncommon, carrying its curiously long (5 ft.) inflorescences (8683 and s.n.).

Calamus brevispadix, Ridl. Mat. Mono., 2, p. 207. A small very spiny rattan only a few feet high, endemic and local. At Fraser Hill it is plentiful and was in flower (8420, 8551).

Daemonorrhops sp. A species of this genus occurs, but has not been determined (7785).

Plectocomia sp. possibly *P. Griffithii*, Becc., is not uncommon about Fraser Hill as it appears to be in the mountains of Telom.

FLAGELLARIACEAE.

Joinvillea borneensis, Becc.: Merrill, p. 109: *J. malayana*, Ridl. Mat. Mono., 3, p. 151. A big grass-like plant 6-8 ft. high occurring in the Malay Peninsula, Borneo and Palawan: in the Peninsula occurring in the Taiping hills, and on the Main range from G. Kerbau and the mountains of Telom to the Semangkok pass. It occurs at Fraser Hill at 4000 ft. (8649).

PANDANACEAE.

Pandanus collinus, Ridl. Mat. Mono., 2, p. 228. A small tree, endemic and montane in the Peninsula, occurring on Kedah

peak, and on the Main range from the mountains of Telom to the Semangkok pass. At Fraser Hill it was not identified; but it was got in fruit on G. Ulu Semangkok (8876).

Freycinetia lucens, Ridl. Mat. Mono., 2. p. 233. A woody climber, endemic, chiefly of the low country along the west side of the Taiping hills and the Main range from Perak to Singapore, now found in flower upon the summit of Pine-tree hill at 4800 ft. (8546), and sterile between that hill and Fraser Hill.

ARACEAE.

Arisaema Scortechinii, Hook. f.: Ridl. Mat. Mono., 3. p. 8. A herb, endemic, montane, occurring in Penang, and on the Main range from G. Bujong Malaka to G. Tampin. At Fraser Hill it is not uncommon (8665), and was newly in flower.

Amorphophallus sp. The leaves of a species of this genus were seen not uncommonly in the forest at Fraser Hill.

Alocasia Beccarii, Engl.: Ridl. Mat. Mono., 3, p. 16: Merrill, p. 104. A herb of deep shade found in Sumatra, the Malay Peninsula and in Borneo: in the Peninsula montane occurring in the Taiping hills, and on the Main chain from the mountains of Telom to Bukit Etam. At Fraser Hill not uncommon and generally in fruit (8425).

Alocasia Lowii, Hook. f.: Ridl., Mat., Mono., 3, p. 18: Merrill, p. 105. A herb, distributed in the Malay Peninsula, Borneo and Java: in the Peninsula in Perlis, and down the Main range from Perak to the south end, and in Malacca; also in P. Tiunan. Below Fraser Hill it occurs at 3300 ft. on the road to the Gap and at 3800 ft. in the upper Tras valley.

Colocasia esculentum, Schott: Merrill, p. 106: *C. antiquorum*, Schott: Ridl., Mat. Mono., 3, p. 16: Koorders, 1. p. 136. A herb, widely cultivated and wild in tropical Asia: run wild in Sumatra, the Peninsula, Borneo and other parts of Malaysia. In the upper Tras valley to about 3800 ft. it is plentiful.

Homalonema humilis, Hook. f.: Ridl. Mat. Mono., 3, p. 25: Merrill, p. 94. A small herb, occurring in the Malay Peninsula and in Borneo: in the Peninsula montane and submontane, in Penang, on the Taiping hills, on the Main range from the mountains of Telom to the neighbourhood of Kuala Lumpur and in the low country under the hills. At the Semangkok pass in the vicinity of the Gap it occurs (7879) in a race which approximates to *H. pumila*, Hook. f.

Schismatoglottis sp. What seems to be an unnamed plant of the Main range and the Taiping hills was obtained (8696).

Anadendrum montanum, Schott.: Ridl. Mat. Mono., 3, p. 36: Koorders, 1. p. 252: Merrill, p. 88. An epiphyte, more or less herbaceous, found in Tenasserim, and Siam, Sumatra, the Malay Peninsula, Borneo, Java, Celebes: in the Peninsula it occurs on G. Raya in Lankawi, on Kedah peak, in Penang, on the Taiping hills, on the hills over Ipoh and Sungei Siput, on the Main range from the mountains of Telom to G. Tampin, and at low levels further south to Singapore. At Fraser Hill it was found in flower.

Raphidophora Korthalsii, Schott: Ridl. Mat. Mono., 3. p. 45: Koorders, 1, p. 255: Merrill, p. 89. An epiphyte of considerable size, distributed chiefly in the interior of western Malaysia i.e. in the Peninsula and in Borneo but reaching west Java in one place: in the Peninsula it occurs in Penang, but has not been collected there in recent years, on the Taiping hills, in the Main range about the Semangkok pass, on P. Tinggi and in Singapore island. It was found between Fraser Hill and the Gap at 3500 ft. in the edge of a gully, in flower (7761).

Raphidophora Wrayii, Hook. f.: Ridl. Mat. Mono., 3. p. 42. An epiphyte of some size, endemic, occurring in Penang, on the Taiping hills, and on the Main range from G. Batu puteh and the mountains of Telom to Fraser Hill (7859) where it is not uncommon and was in flower and fruit.

Pothos salicifolia, Ridley sp. nov. with almost linear leaves and dull yellow fruit (7827) at Fraser Hill.

Scindapsus Scortechinii, Hook. f.: Ridl. Mat. Mono., 3. p. 38. A big epiphyte, endemic, and montane, occurring in the Bandon province of Siam at 4000 ft., on Kedah peak, in the Taiping hills, and on the Main range from G. Bujong Malaka and the mountains of Telom to Bukit Etam. At Fraser Hill it was in flower and fruit (8659, 8934) and extended to the summit of Pine-tree hill (8547).

CYPERACEAE.

Cyperus rotundus, Linn.: Ridl. Mat. Mono., 3. p. 68: Merrill, p. 56: *C. rotundatus*, Linn.: Koorders, 1, p. 190. A herb, pantropic, in the Peninsula occurring here and there. At Fraser Hill not common (7893).

Kyllingia brevifolia, Rottb.: Ridl. Mat. Mono., 3. p. 58: Merrill, p. 58: *Cyperus brevifolius*, Suringar: Koorders, 1, p. 185. A small herb, pantropic and into warm regions generally except south Europe: in the Peninsula general in the low country, but except that it has been collected before on the top of the hills in Penang and at 4000 ft. on G. Kerbau with no montane records, but to be expected at all elevation as the result of the invasion of man. At Fraser Hill it is found about the mined area (7853).

Fimbristylis annua, R. and S.: Merrill, p. 60: *F. diphylla*, Vahl: Ridl. Mat. Mono., 3. p. 91: Koorders, 1, p. 199. A herb, pantropic, very common through the Peninsula and reaching Fraser Hill (8953) as a new intruder, being found chiefly upon bullock-droppings.

Hypolytrum latifolium, L. C. Rich.: Ridl. Mat. Mono., 3. p. 100: Koorders, 1, p. 184: Merrill, p. 54. A herb, distributed in southern India and Ceylon, in north eastern India and China and southwards to the Malay Peninsula, Borneo, west Java and to Australia and parts of Polynesia: in the Peninsula it is common through the low country and has been collected at 2000 and 3500 ft. on G. Kerbau, on Hermitage hill and on the Penang hills. It was not found at Fraser Hill but at 3000 ft. near the Gap (8885) in young fruit.

Gahnia javanica, Moritzi: Ridl. Mat. Mono., 3, p. 99: Koorders, 1, p. 202: Merrill, p. 63. A herb, distributed from Sumatra through the Peninsula, Borneo, west and mid Java to New Caledonia and Fiji: in the Peninsula montane found on Kedah peak, in Penang at 2500 ft., on the Taiping hills, on G. Tahan, on the Main range from G. Kerbau and G. Batu puteh to Bukit Etam, on Mt. Ophir, and in Johore upon quite low hills, even on Bukit Panggerang at the extreme south. At Fraser Hill it is exceedingly common in cleared places (7768), but very rarely in flower.

GRAMINEAE.

Paspalum conjugatum, Berg. Ridl. Mat. Mono., 3, p. 124: Koorders, 1, p. 121. A herb, pantropic, in the Peninsula very common at low elevations; but of its occurrence in the hills there seems to be but two records which are both Mr. Ridley's, one of his finding it at Padang Batu on Mt. Ophir and the second of finding it on Sakai clearings in the mountains of Telom. At Fraser Hill it is the commonest of all grasses about the houses (s.n.).

Paspalum sanguinale, Lam.: Ridl. Mat. Mono., 3, p. 125: Koorders, 1, p. 127. A pantropic herb, in the Peninsula common at low elevations, but scarcely recorded as in the hills. At Fraser Hill it is rare at present, and the place in which it is found is bullock-droppings upon the roads (8952).

Paspalum longiflorum, Rötze. Ridl. Mat. Mono., 3, p. 126: Koorders, 1, p. 121: Merrill, p. 43. A herbaceous weed of wide distribution through the warm parts of the Old World: in the Peninsula said to be common. At Fraser Hill a weed in the vegetable garden (7849).

Panicum indicum, Linn.: Ridl. Mat. Mono., 3, p. 134: Koorders, 1, p. 132. A herb distributed from India in general to the Pacific: in the Peninsula a common weed, which has been recorded as reaching 3000 ft. on G. Kerbau. At Fraser Hill it is abundant on cleared ground (7845).

Panicum plicatum, Lam.: Ridl. Mat. Mono., 3, p. 136: *P. palmifolium*, Koen.: Koorders, 1, p. 135. A herb, in Ceylon, in the moister Himalaya, China and southward to the Malay Peninsula, Java: in the Peninsula it occurs not uncommonly at low levels. Under Fraser Hill it was found at 3500 ft. in the mined area of the upper Tras valley.

Isachne albens, Trin. The second in abundance of the intruding grasses of Fraser Hill. It occurs on G. Tahan and on G. Hijau, in the Taiping hills, and has probably reached Fraser Hill in vegetable seeds from the Taiping hill-garden. It is now common on roadsides at Fraser Hill (7767).

Imperata cylindrica, Bauh: Merrill, p. 38: *I. arundinacea*, Cyrillo: Ridl. Mat. Mono., 3, p. 152: Koorders, 1, p. 102. A pantropic grass, everywhere in the Peninsula. This—the tall lallang

grass probably reached the neighbourhood of Fraser's bungalow many years ago; but it does not thrive to the exclusion of everything else there, and though common in that part of Fraser Hill is not general: it is more plentiful in the upper Tras valley.

Pogonatherum paniceum, Hack.: Merrill, p. 40: *P. saccharoidium*, Brauv., Ridl. Mat. Mono., 3, p. 154: Koorders, p. 107. A small grass widely distributed from India to Japan and southwards to Malaysia, where it is wide spread. Under Fraser Hill in the mined lands of the upper Tras valley it is plentiful.

Sporobolus indicus, R. Br.: Ridl. Mat. Mono., 3, p. 171: Koorders, 1, p. 146. A pantropic herb; in the Peninsula sporadic through the lowlands. At Fraser Hill it is not uncommon about clearings (s.n.).

Eleusine indica, Gaertn.: Ridl. Mat. Mono., 3, p. 174: Koorders, 1, p. 153: Merrill, p. 50. A pantropic weed, common in the lower country of the Malay Peninsula. At Fraser Hill invading the roads from the droppings of bullocks.

Phragmites Karka, Trin.: Ridl. Mat. Mono., 3, p. 175: Koorders, 1, p. 156: Merrill, p. 50. A large grass widely distributed through the tropics of the Old World. In the upper Tras valley over mined lands at 3300-3800 ft.

Lophatherum gracile, Brongn.: Ridl. Mat. Mono., 3, p. 181: Koorders, 1, p. 160: Merrill, p. 52. A grass distributed in southern India and Ceylon, in the eastern Himalaya and to Japan, southwards through Burma to the Malay Peninsula, Borneo, the Philippines and New Guinea: in the Peninsula found widely in the South; but in the north montane, being on Chong in west Siam at 2500 ft., on Kedah peak and on the Taiping hills. At Fraser Hill it is not uncommon.

Dendrocalamus pendulus, Ridl. Mat. Mono., 3, p. 192. A graceful bamboo, half sprawling occurring in the Main range from the mountains of Telom to the neighbourhood of Kuala Lumpur. At Fraser Hill it reaches 4100 ft. (7892), but as it was not in flower doubt attaches to the identification.

Schizostachyum latifolium, Gamble: Ridl. Mat. Mono., 3, p. 190: Koorders, 1, p. 179. A rather short bamboo distributed in the Peninsula and thought that it may be possibly in Java: in the Peninsula it occurs on G. Tahan, and on the Main range from G. Kerbau to the Semangkok pass and at low level in Malacca. Under Fraser Hill it ascends to 3500 ft. on the Selangor side of the range (7774).

CRYPTOGAMS.

The nomenclature of the ferns is that adopted by van Alderwerelt. Distributions of mosses are taken from Brotherus' monograph on the Bryales in Engler's *Pflanzenfamilien* (I, 3). The works quoted under each species are:—

Van Alderwerelt van Rosenburgh, C. R. W. K.; *Handbook to the ferns of the Malay Islands*, Batavia 1908; *Supplement*, 1917; quoted as van Alderwerelt.

Ridley, H. N., A list of the ferns of the Malay Peninsula, *Jour. Straits Branch, R. Asiatic Society* No. 50, 1908; quoted as Ridley.

Ridley, H. N., The Fern-Allies and Characeae of the Malay Peninsula, *Jour. Straits Branch, R. Asiatic Society* No. 80, 1919; quoted as Ridley Fern-Allies.

Beddome, R. H., *Handbook to the ferns of British India*. Calcutta, 1883, with Supplement; quoted as Beddome.

FERNS.

Gleichenia glauca Hk.; van Alderwerelt p. 58, Ridley p. 6, Beddome p. 2. On the Himalayas at 4000-7000 feet, in southern China and Japan, extending through Malaysia to the Philippines, Polynesia and Australia, and in Central America. In Java and in the Peninsula it is a montane species, abundant on the hills from about 1000 feet upwards. Common at Fraser Hill, in the open and in moderate shade (8778).

Gleichenia linearis Clarke; van Alderwerelt p. 59; Ridley p. 7; Beddome p. 4.

Tropical and subtropical, throughout the world. Very common everywhere in the Peninsula. At Fraser Hill quite as abundant as at lower altitudes. A very large form was found by the valley path (8777).

Cyathea moluccana R. Br.; van Alderwerelt p. 15; *C. brunonis* Wall. Ridley p. 7.

Confined to the Malaysian region and the Philippines. In the Peninsula it is common in forests at low altitudes, the highest record being 3300 feet on G. Tahan. It does not occur at Fraser Hill, but is common by roadsides at the Gap (8826).

Alsophila dubia Beddome Suppl. p. 4, van Alderwerelt p. 31, Ridley p. 9.

This species is recorded from Java, Sumatra and Borneo; in the Peninsula it has been collected on the Taiping Hills and on G. Bubu, on G. Tahan, and on the main range from G. Kerbau to Fraser Hill, where it is fairly common in more open places in the jungle (8797, 8813).

Alsophila obscura Scort.; van Alderwerelt p. 34; Ridley p. 9.

Probably endemic. This species was originally found by Scortechini on the Taiping Hills; specimens collected subsequently at other localities appear to be identical with it, but have been referred to *A. comosa* Hk. They are, however, quite distinct from specimens of the latter species from Perak, named at Calcutta, which also agree with Hooker's description and figure (Spec. Fil. Vol. I, p. 53, Pl. 20). Including these specimens which appear

erroneously to have been referred to Hooker's species, *A. obscura* occurs in Penang, on the Taiping Hills, on the main range from Telom to G. Angsi, on Mt. Austin in Johore and on Singapore Island. Some of the fronds from Singapore differ more or less from the typical form of the species, being paler and less coriaceous. At Fraser Hill, it is one of the smaller tree ferns, fairly abundant. (8779, 8796).

Alsophila commutata Mett.; van Alderwerelt p. 34; Ridley p. 8; Beddome p. 14.

Known only from Batjan and Borneo (van Alderwerelt, Supplement p. 59) outside the Peninsula. A montane species, occurring on Kedah peak, Taiping Hills, on the main range from Bujong Malacca to Bukit Kutu, and on Mt. Ophir. A small tree fern, growing on Fraser Hill in partly cleared forest (8793), and in low forest on G. Ulu Semangkok (8912), where it was not found fertile. A curious feature, not mentioned by the authors quoted, but shewn also by Ridley's specimens from Bujong Malacca and Bukit Hitam, is the presence of several much reduced pinnae at the bases of the stipes (cf. a similar feature in *Cyathea Beyrichiana*, figured in Christ, *Geographie der Farne*, Jena 1910, p. 45).

Alsophila Kingii Clarke; van Alderwerelt p. 36; Ridley p. 9; Beddome p. 475.

Endemic. Originally collected on G. Bubu at 5000 feet, and since found on G. Tahan, and on G. Pantai in Johore, (Ridley), but we have no specimen from the last-named locality. Found in a rather open situation on the quartz slope below Reservoir Crest, and not noticed elsewhere (8492). The fertile pinnules are very much reduced.

Alsophila latebrosa Wall.; van Alderwerelt p. 38, Suppl. p. 51; Ridley p. 8; Beddome p. 11.

Occurs on the mountains of southern India from 3000 to 7000 feet, and in northern India from 3500 to 5000 feet, throughout Malaysia to the Philippines and in southern China. On the Peninsula "the commonest tree fern in the low country" (Ridley). It has been found up to 5000 feet on the Taiping Hills, on Penang Island, and at numerous localities in Selangor, Malacca, Negri Sembilan, Johore and Singapore Island. In Java very common up to the middle mountain zone. At Fraser Hill, probably the commonest of the smaller tree ferns (8825, 8794).

Alsophila glauca, J. Sm.; van Alderwerelt p. 41; Ridley p. 8; Beddome p. 12.

Distributed from the hills of northern India and Burma throughout the Malaysian region to the Philippines. In the Peninsula it is a montane species, occurring on G. Rava, Lankawi, the Taiping Hills, on the top of Penang hill, on the main range south to G. Angsi, and on Bukit Soga in Johore. It has also been collected on Pulau Tioman. The largest tree fern in the

Fraser Hill area, frequent in open places in the jungle and especially abundant in the valley which had been formerly cleared for tin mining (8812).

Cibotium barometz J. Sm.; van Alderwerelt p. 48; Ridley p. 10; Beddome p. 24.

Distributed probably throughout Malaysia, in the Philippines, Assam and southern China. In the Peninsula "in woods at no elevation, not rare" (Ridley). It has been collected on Kedah peak at 1100 feet, on the Taiping Hills, at various points on the main range from G. Kerbau to Bukit Kutu, at Klang Gates and on Penang Island. Abundant in cleared places and also in moderate shade, the fronds sometimes as much as 15 feet in length, including the stipe.

Hymenophyllum australe Willd.; van Alderwerelt p. 69 and 797; *H. javanicum* Spr., Ridley p. 11, Beddome p. 32.

Extends from the Himalayas through Malaysia to Australia and New Zealand. In the Peninsula it has been collected on the Taiping Hills, on the main range at Telom and Ginting Sempah, on Mt. Ophir and on G. Pulau in Johore. It was found at Fraser Hill by Mrs. Smith.

Hymenophyllum Blumeum Spr.; van Alderwerelt p. 71; *H. polyanthos* Sw., Ridley p. 10, Beddome p. 30.

Generally distributed through the rain forest regions of tropical Asia. In the Peninsula found at many localities, on the hills in the north and at lower altitudes in Johore and Singapore. At Fraser Hill this species was collected by Mrs. Smith; the fronds are broad, and do not correspond to Beddome's *H. polyanthos* v. *Blumeum*.

Hymenophyllum formosum Brack.; van Alderwerelt p. 72; *H. dilatatum* Sw., Ridley p. 11, Beddome Suppl. p. 7.

Extends from Malaysia into the Pacific, to Australia and New Zealand. In the Peninsula it has previously been collected on the Taiping Hills only. It is represented in Mrs. Smith's collection.

Hymenophyllum serrulatum C. Chr.; van Alderwerelt p. 79; *H. Smithii* Hk., Ridley p. 11, Beddome p. 34.

A Malaysian species, extending to New Guinea. In the Peninsula it has been found on the Taiping Hills, on the main range from Bujong Malacca to Bukit Hitam in Selangor, on Penang Hill, G. Benom, and in Johore and Singapore. At Fraser Hill, it is very abundant on trees in the jungle (8451).

Hymenophyllum Neesii Hk.; van Alderwerelt p. 81, Ridley p. 11, Beddome p. 35.

Occurs in Ceylon and Malaysia. In the Peninsula "common on trees, low country up to 4000 feet" (Ridley); it has been collected from numerous localities, including Singapore. At Fraser Hill it is very abundant (8413, 8415).

Trichomanes sublimatum K. Müll.; van Alderwerelt p. 86; *T. muscoides* Sw. var. *sublimatum*, Ridley p. 12.

On the Khasya Hills and through Malaysia to New Guinea. In the Peninsula it is probably widely distributed, and has been found on Bujong Malacca, Mt. Ophir, in the Telok Reserve near Klang, and in Singapore Island. At Fraser Hill it was seen twice, on deeply shaded wet rocks by small streams (9180).

Trichomanes digitatum Sw., van Alderwerelt p. 89, Ridley p. 12; Beddome p. 39.

Found in the Mascarenes, Ceylon, and through Malaysia to Polynesia and Australia. In the north of Peninsula it is only recorded from the hills (Taiping Hills, main range from G. Kerbau to Bukit Kutu, G. Tahan at 4000-5000 feet) but it is found on Singapore Island. At Fraser Hill it is common on tree trunks near the ground, in the forest (8770).

Trichomanes proliferum Bl.; van Alderwerelt p. 90, Ridley p. 13; Beddome p. 39.

On the hills of Ceylon and southern India, in Malaysia and the Philippines. In the Peninsula it has only been recorded from the Taiping Hills, up to 4000 feet. At Fraser Hill found on tree trunks in the forest (8836).

Trichomanes bipunctatum Poir.; van Alderwerelt p. 95, Ridley p. 13, Beddome p. 41.

Occurs in tropical Africa, tropical Asia, Polynesia and Australia. It has been collected in both low and high country, certainly up to 4000 feet, in various parts of the Peninsula, and in Singapore Island. At Fraser Hill it is one of the less abundant species. It is possible that the specimen should be referred to *T. bilabiatum*, an allied species with a more restricted distribution (8833).

Trichomanes maximum Bl.; van Alderwerelt p. 99, Ridley p. 14; Beddome Suppl. p. 10.

A species common to Malaysia, Polynesia and northern Australia. It has been collected on the hills in the Peninsula from G. Kerbau to Johore, but not in the low country. At Fraser Hill collected once only, on shaded rocks above the stream in the valley (8903).

Trichomanes rigidum Sw.; van Alderwerelt p. 102, Ridley p. 13; Beddome p. 44.

A pantropical species, in the Peninsula collected especially from the hill forests, but also found in Singapore Island. At Fraser Hill it is one of the few species which are found in full shade on the ground in the forest, and is abundant (8465).

Trichomanes pluma Hk.; van Alderwerelt p. 106, Ridley p. 14; Beddome Suppl. p. 11.

In Malaysia and Polynesia, extending to New Caledonia. Found in hill forests in the Peninsula on the Taiping Hills, on the main range from G. Bernmban to Ginting Bidai, on G. Tahan

and Mt. Ophir, the highest record being 6000 feet on G. Kerbau. At Fraser Hill it is a fairly common species of the forest floor, occasionally found on the bases of tree trunks (8734).

Oleandra neriiformis Cav.; van Alderwerelt p. 152. Ridley p. 40; Beddome p. 285.

This species is found in tropical Africa and America, on the eastern Himalayas at 2000-5000 feet, through Malaysia to New Guinea and Polynesia. In the Peninsula it is montane, and has been found at nearly all localities where collections have been made. It has a decidedly xerophytic habit and at Fraser Hill was sometimes found in the fern thickets in open places, though usually growing in the jungle, climbing some distance up the tree (8497). The form collected differs somewhat from typical *O. neriiformis*, in that the stipes, which are always very short, are jointed at the base of the lamina. In other respects it agrees with *O. neriiformis* rather than with *O. colubrina*.

Nephrolepis acuminata, Kuhn.; van Alderwerelt, p. 159; *N. davallioides* Kze., Ridley p. 39, Beddome Suppl. p. 81.

Confined to Malaysia and New Guinea. In Java it is a common epiphyte, from the low country to the middle forest zone of the mountains. In the Peninsula it has been collected on the Taiping Hills at 3600-4000 feet, at Telom, and on Bukit Hitam at 4000 feet. At Fraser Hill it is a common epiphyte, growing luxuriantly on the trunks of trees in the jungle, the fronds up to 2 m. in length. It occurs also on the rocks in the open mining valley (8848, 8494).

Nephrolepis cordifolia, Pr.; van Alderwerelt, p. 160, Beddome p. 282.

A pantropical species, occurring throughout the Indian region up to 5000 feet elevation, and in Java a common ground fern in not too deeply shaded or quite open places up to 8000 feet. There are no specimens from the Peninsula in the Singapore herbarium and Ridley does not record it. At Fraser Hill it was found on bare ground, quite in the open (8495).

Nephrolepis exaltata, Schott.; van Alderwerelt, p. 161, Ridley p. 39, Beddome p. 282.

A pantropical species. Abundant at low altitudes at least in the south of the Peninsula, but little collected in the north, except at Penang. It often grows on trees and rocks, with long pendulous fronds. The present writer cannot certainly say what is its frequency and habit at Fraser Hill, but it is probably abundant. Mrs. Smith's specimen is labelled "open space, jungle."

Nephrolepis biserrata, Schott.; van Alderwerelt, p. 162; *N. acuta*, Pr., Ridley p. 39, Beddome p. 284.

A pantropical species. It is very abundant in the south of the Peninsula where secondary growth is beginning to replace cleared jungle: it has hardly been collected in the north except on Penang Island. At Fraser Hill comparatively small plants were noted on cleared ground.

Dryopteris crassifolia, O. Kze.; van Alderwerelt, p. 182;
Lastraea crassifolia, Ridley p. 35, Beddome p. 238.

Burmah and Malaysia, extending to the Philippines. In the Peninsula it is probably general in the forests of the low country and on the hills to at least 4000 feet. It has been collected on Singapore Island and in the lowland forests of Johore and Malacca, and also on Mt. Ophir and the Taiping Hills. A ground fern of the jungle, noticed only on South Ridge (8765).

Dryopteris calcarata, O. Kze.; van Alderwerelt, p. 185;
Lastraea calcarata, Beddome p. 235, Ridley p. 35.

General throughout southern tropical Asia, Malaysia and the Philippines, extending into Polynesia. In the Peninsula the typical form of the species has only been collected on the Taiping Hills, on G. Kerbau and Ulu Semangkok. At Fraser Hill it is a common ground fern of the jungle, the stem sometimes projecting nearly a foot above the surface of the ground (8736, 8790).

Dryopteris singalanensis, C. Chr.; van Alderwerelt, p. 192;
Lastraea singalanensis Beddome Suppl. p. 54, Ridley p. 35.

Previously known from the Taiping Hills at 3500-4000 feet, and from Mt. Singalan in Sumatra. At Fraser Hill collected once only, on the open valley-side (8811).

Dryopteris ferox, O. Kze.; van Alderwerelt, p. 221; *Nephrodium ferox* Moore, Beddome p. 279, Ridley p. 38.

In northern India, Malaysia and the Philippines. In the Peninsula it has been collected only on the Taiping Hills at 2000 feet, at Fraser Hill and on Penang Hill. Only one mature specimen was seen (8795), in partially cleared jungle on the valley side, but young plants, probably of this species, were abundant near by.

Dryopteris parasitica, O. Kze.; van Alderwerelt, p. 224;
Nephrodium molle R. Br., Ridley p. 37, Beddome p. 277.

Pantropical. Common throughout the Peninsula, in the low country and on the hills (8901).

Dryopteris truncata, O. Kze.; van Alderwerelt, p. 227;
Nephrodium truncatum Pr., Ridley p. 38, Beddome p. 280.

Extends to Madagascar and to Polynesia and Australia. In the Peninsula it has been collected in low country in Perak, and also on the Taiping Hills and on G. Kerbau at 5000 feet, and at low altitudes in Selangor, Johore and Singapore. It was found by Mrs. Smith at Fraser Hill.

Dryopteris heterocarpa, O. Kze.; van Alderwerelt, p. 228;
Nephrodium heterocarpum Moore, Ridley p. 38, Beddome Suppl. p. 78.

A western Malaysian species, collected in the Peninsula on the Taiping Hills at 2500-3000 feet, at Telom in Pahang, in Negri Sembilan and on the Islands of Penang and Singapore. At Fraser Hill it was only found below 4000 feet, abundantly by the forest path down to the Gap and in the mining valley (8814, 8763).

Mesochlaena larutensis, (Bedd.) van Alderwerelt, p. 232; *Nephrodium larutense* Beddome, Suppl. p. 73, Ridley p. 38.

Reported only from Borneo (Copeland) outside the Peninsula. The species was originally collected on the Taiping Hills, and has since been found at Telom and Ginting Sempah on the main range. It was not noticed at Fraser Hill, but was found once only in the forest at the foot of G. Ulu Semangkok, just above the Gap (8913).

Aspidium pachyphyllum, Kze.; van Alderwerelt, p. 252, Ridley p. 33, Beddome Suppl. p. 46.

A Malaysian and Polynesian species, previously collected in Perak at altitudes from 100 to 1500 feet. At Fraser Hill it was only found by the present writers by the valley path in the edge of the jungle (just below 4000 feet) and always sterile. Mrs. Smith, however, sent a fertile frond, collected at about 4000 feet.

Odontosoria chinensis, J. Sm.; van Alderwerelt, p. 259; *Stenoloma chinensis* Bedd., Ridley p. 19, Beddome p. 70.

In Madagascar, Ceylon and southern India on the mountains, northern India to southern China and Japan, and through Malaysia to the Philippines and Polynesia. In the Peninsula "on banks at considerable altitudes, this plant seems to prefer stiff yellow clays" (Ridley). It has been collected at Jor in Perak, on the main range at the Semangkok pass and Ginting Bidai, by the Tahan river and on Penang Hill. At Fraser Hill abundant in open places on the clay, not usually among the first plants on bare ground (8496).

Lindsaya pectinata, Bl.; van Alderwerelt, p. 269.

Distributed from Assam through Malaysia to the Philippines. This species is hardly distinguishable from *L. scandens* on the one hand and from *L. repens* (with which it is included by Beddome) on the other; the present specimen has exactly the form and habit of *L. scandens* except for a slight lobing of the edge of the leaflets, and consequent interruption of the sori, while specimens from elsewhere with less decurved lower margins of the leaflets grade into *L. repens*. All are creeping or climbing ferns of the jungle and are widely distributed in the Peninsula. *L. pectinata* is common at Fraser Hill (8452); *L. scandens* proper was not noticed.

Lindsaya orbiculata, Mett.; van Alderwerelt, p. 270, Ridley, p. 20, Beddome p. 75.

In Ceylon and southern India, northern India to southern China, and through Malaysia to Australia. In the Peninsula it is a ground fern of the forest, chiefly montane. It has been collected on Kedah Peak at 1000 feet, on the Taiping Hills, on the main range from Bujong Malacca to G. Angsi, on G. Tahan, and on Penang Island. At Fraser Hill it is one of the most constant ground ferns, occurring in quite deep shade (8400).

L. orbiculata var. **polymorpha**, Hk.

No. 8762. This form is equally abundant with the typical form of the species, and in some cases shows transitions to the

latter. The only other specimens of this variety in the Singapore herbarium are from Penang.

Lindsaya decomposita, Willd.; van Alderwerelt, p. 274; *Schizoloma lobata* Beddome, p. 77, Ridley p. 21.

In Ceylon and southern India, through Malaysia to Polynesia and Australia. In the Peninsula not confined to the mountains, at least in the south, being found at low altitudes in Johore and Negri Sembilan. It is difficult to separate this species from *L. davallioides*. At Fraser Hill it occurs along with *L. orbiculata* (8707, 8474). Some specimens show little or no anastomosis of veins.

Humata repens, Diels; van Alderwerelt, p. 288; *H. pedata* J. Sm., Ridley p. 16, Beddome p. 48.

In the Mascarenes, Ceylon and southern India at 3000-4000 feet, the eastern Himalayas and southern China, and through Malaysia to Australia. In the Peninsula it is not confined to the mountains and has been collected at numerous localities. At Fraser Hill it is a common epiphyte, the fronds frequently rather small (8463).

Davallia bullata, Wall.; van Alderwerelt, p. 303, Ridley, p. 17, Beddome p. 61.

Found on the mountains of southern India, on the eastern Himalayas to 6000 feet, in Burmah, southern China and Japan, Malaysia and the Philippines. In the Peninsula it is montane, occurring on Kedah Peak at 3000-4000 feet, on the Taiping Hills, and on the main range from G. Berumban to Ginting Bidai. At Fraser Hill, a fairly common epiphyte (8706).

Davallia divaricata, Bl.; van Alderwerelt, p. 305, Ridley, p. 17, Beddome p. 60.

Found on the eastern Himalayas and in southern China, Malaysia and the Philippines. In Java it is a common epiphyte, from sea level to the lower forest zone; in the Peninsula it has previously been collected only on the Taiping Hills at 3000 feet. At Fraser Hill, found only at about 3500 feet, in the old mining valley, on granite boulders near the stream (8846).

Tapeinidium pinnatum, C. Chr.; van Alderwerelt, p. 314; *Microlepia pinnata* J. Sm., Ridley p. 18, Beddome p. 64.

In southern India and spread through Malaysia to Polynesia. In the Peninsula it has been found on the Taiping Hills at 2000-3000 feet, on the main range from Telom to G. Tampin, on G. Tahan at 3000 feet, on Penang Hill, Mt. Ophir and G. Pulai, and in Singapore Island. At Fraser Hill collected by Mrs. Smith at about 4000 feet.

Dennstaedtia moluccana Moore, var. **sinuata** Bonaparte; van Alderwerelt p. 146.

A scrambling fern with aculeate rachis found on the cleared hilltop of South Summits at Fraser Hill in a thicket of *Pteridium*, *Gleichenia*, etc. (8817) has been identified as above by H. H. Prince

R. Bonaparte. *D. moluccana* has a distribution in Malaysia, Fiji and Formosa; no other record of it from the Peninsula is known.

Hypolepis tenuifolia, Bernh.; van Alderwerelt, p. 336.

This species is distributed from Malaysia to Australia, Polynesia and New Zealand, and occurs also in southern China. The only specimens in the Singapore herbarium from the Peninsula are from Fraser Hill, collected by Mr. Hose, Mrs. Smith and the present writers (8498). It appears doubtful however whether Beddome's *H. punctata* from the Taiping Hills (Beddome, Suppl. p. 19) is really distinct from the present species, as the only difference seems to be in the character of the hairs on the rachis and leaflets. *H. tenuifolia* from Fraser Hill is rather densely covered with viscid glandular hairs.

Histiopteris incisa, J. Sm.; van Alderwerelt, p. 349; *Litobrochia incisa* Pr., Ridley p. 25, Beddome p. 120.

Pantropical. In Ceylon and southern India it occurs on the hills at 3-4000 feet, and on the Khasya Hills to 6500 feet. In Java it extends from the plains to the highest summits. In the Peninsula it has been collected on the Taiping Hills, G. Kerbau, Kedah Peak, and on the Islands of Penang and Singapore. At Fraser Hill it is abundant in the open, young plants being very abundant by the paths, and both the typical form and Beddome's var. *integrifolia* (8499) occur. The latter variety has only been collected previously in Perak.

Pteridium aquilinum (L.) Kuhn.; van Alderwerelt, p. 377; *Pteris aquilina* L., Ridley p. 24, Beddome p. 115.

Distribution worldwide. Abundant in open places all over the Peninsula at all altitudes. At Fraser Hill forming dense thickets, with *Gleichenia* and other ferns, on the cleared hilltops.

Blechnum orientale, L.; van Alderwerelt, p. 387, Ridley, p. 26, Beddome p. 132.

Distributed generally through tropical Asia and through Malaysia to Polynesia and Australia. In southern India it is found on the hills up to 6000 feet, and in Java from sea level up to the summit of G. Gedeh. In the Peninsula it grows only in the open, and is very common almost everywhere. At Fraser Hill young plants are very abundant on newly cleared ground, especially by paths in the jungle (8493).

Diplazium subserratum, Moore; van Alderwerelt, p. 400, Ridley p. 29, Beddome p. 174.

Known only from the Peninsula, Java and Borneo. In Java it is a ground fern of the lower forest zone (3000-5000 feet): in the Peninsula it has been collected on the Taiping Hills, on the main range from Telom south to Ginting B'dai, and on Penang Island. At Fraser Hill, a ground fern of the forest, noticed once only (8902).

Diplazium sylvaticum, Sw.; van Alderwerelt, p. 402, Ridley, p. 30, Beddome p. 177.

A pantropical species. In Java, Raciborski records it from the woods of the low country only. It has been found on the Lankawi Islands, on the Taiping Hills, on the main range at G. Berumban and Bukit Kutu, and at lower altitudes in Pahang, Selangor, Malacca and in Singapore Island. At Fraser Hill it is of local occurrence, a ground fern of the jungle (8818).

Diplazium bantamense, Bl.: van Alderwerelt, p. 405, Ridley, p. 30, Beddome p. 177.

In southern and northern India and southern China, and through Malaysia to the Philippines and the New Hebrides. In Java it is a common ground fern of the lower and middle forest zones, rare in the low country; in the Peninsula it occurs on the Taiping Hills at 3000 feet, on the main range from Perak to Negri Sembilan, in Pahang, and at lower altitudes in Malacca and Singapore. A ground fern of the forest (10018).

Diplazium tomentosum, Bl.: van Alderwerelt, p. 414, Ridley p. 30, Beddome p. 179.

Confined to Burmah and western Malaysia. In the Peninsula it is widely distributed in the lowlands, and also in the hills from Perak to Johore, and in Singapore Island: a ground fern of the forest. Locally abundant at Fraser Hill (8816).

Diplazium speciosum, Bl.: van Alderwerelt, p. 415, Ridley, p. 30, Beddome p. 178.

A Malaysian species (occurring also in Indo-China?). widely distributed in the Peninsula from Kedah to Singapore, both at low altitudes and on the hills, in forests (10019).

Diplazium polypodioides, Bl.: van Alderwerelt, p. 419, Beddome p. 184; *D. asperum* var. *polypodioides*, Ridley p. 31.

Distributed from Ceylon, southern and northern India through Malaysia to the Philippines and to Australia. The distinction between this species and *D. asperum* as found in the Peninsula is not very marked: Ridley has included both as varieties of the same species, though Beddome separates them and considers *D. polypodioides* to be an extreme form of *D. latifolium*. The present specimen (8844), found in the valley near the stream, appears to be nearer typical *D. polypodioides* than others collected in the Peninsula, but has a decidedly rough stipe. The two species together have been found in Penang Island, at Ulu Bubong in Perak, and on the main range at Ulu Temengo and Ginting Sempah.

Diplazium cordifolium, Bl.: van Alderwerelt, p. 422; *Anisogonium cordifolium* Bedd.; Ridley p. 31, Beddome p. 191.

Distributed from tropical Africa through India and Malaysia to Polynesia. In the Peninsula it has been collected chiefly on the hills, in Perak up to 5000 feet and on the main range at several points, but also at lower altitudes in Selangor and on Singapore Island. A ground fern of the jungle, found once only, just below 4000 feet by the valley path (8850).

Diplazium fraxinifolium, Pr.; van Alderwerelt, p. 423; *Anisogonium lineolatum* Mett., Ridley p. 31, Beddome p. 191.

Distributed through Malaysia and the Philippines, and also in Japan (van Alderwerelt). In the Peninsula it is a montane species, collected on the Taiping Hills at 3000-4000 feet, on the main range at Telom and G. Batu Puteh (2000-3000 feet) and on Penang Hill. At Fraser Hill a ground fern of the jungle (8799).

Diplazium proliferum, Thouars v. **accedens** (Bl.); van Alderwerelt p. 424; *Anisogonium decussatum* Beddome, Suppl. p. 40, Ridley p. 31.

Found in tropical Africa and Madagascar, through Malaysia to Polynesia and northern Australia, but not in India. The only other records from the Peninsula are from the Taiping Hills up to 4500 feet and from Telom. Found once only, in moist ground by the valley path, rather in the open (8780).

Asplenium nidus, L.; van Alderwerelt, p. 439; *Thamnopteris nidus* Pr., Ridley p. 26, Beddome p. 137.

Occurs in Madagascar, in tropical Asia generally, and through Malaysia to Australia. It is common on trees throughout the Peninsula, and was of occasional occurrence at Fraser Hill.

Asplenium Scortechini, Beddome, Suppl., p. 27, Ridley, p. 27, van Alderwerelt p. 443.

Endemic and montane, previously collected on the Taiping Hills at 3000-4000 feet, and on the main range at G. Berumban in Pahang. An epiphyte, on tree trunks in the forest, not common (8776).

Asplenium normale, Don; van Alderwerelt, p. 453, Ridley, p. 27, Beddome p. 144.

On the mountains of southern India and Ceylon at 3000-6000 feet, the eastern Himalayas and Khasya Hills, in southern China, and through Malaysia to the Philippines and islands of the Pacific. In the Peninsula found on Kedah Peak, on the Taiping Hills at 5000 feet, and on the main range at Telom. At Fraser Hill fairly common on the ground and on trees near the ground (8464).

Asplenium tenerum, Forst.; van Alderwerelt, p. 458, Ridley, p. 28; Beddome p. 147.

In tropical Africa, Ceylon, and through Malaysia to the Philippines, New Guinea, and Polynesia. In the Peninsula widely distributed and not confined to the hills, found also on Singapore Island. At Fraser Hill it grows on the ground and on trees in the jungle (10020).

Asplenium caudatum, Forst.; van Alderwerelt, p. 460, Ridley, p. 28; Beddome p. 151.

A pantropical species. In the Peninsula it appears to be montane and has only been collected from the Taiping Hills at 2500-4000 feet. At Fraser Hill not common, an epiphyte in the jungle (10021).

Asplenium praemorsum, Sw.; van Alderwerelt, p. 470; *A. furcatum* Thb., Beddome p. 157.

A pantropical species, occurring on the mountains of southern India and Ceylon at 5-7000 feet, and in Java above 7000 feet. It has not previously been recorded from the Peninsula, but a single specimen growing epiphytically at Fraser Hill (8485) seems to be nearer to it than to any other species of *Asplenium*.

Asplenium nitidum, Sw.; van Alderwerelt, p. 471, Ridley, p. 29, Beddome p. 157.

Occurs in the forests of Ceylon and south India, on the Khasya Hills at 1000-4000 feet altitude, through Malaysia to the Philippines and in the Mascarenes. In Java it is found in the lower and middle forest zones up to 6000 feet. In the Peninsula it has been collected on the Taiping Hills up to 4000 feet, on the Tahan river, on Pulau Tioman, and at various localities in Johore and on Singapore Island. At Fraser Hill it is epiphytic, and not common (8905).

Phegopteris laserpitiifolia, Beddome, Suppl., p. 84, Ridley, p. 40, van Alderwerelt p. 494.

Endemic and montane. Collected only in Perak (no locality) and on the main range at Telom. A ground fern of the forest, found only once, on Lower North Ridge (8798).

Dipteris conjugata, Reinw.; van Alderwerelt, p. 523; *D. Horsfieldii*, Beddome p. 336, Ridley p. 44.

Throughout Malaysia, extending to the Philippines, New Guinea and Polynesia, and also in Formosa. In the Peninsula "on rocks by the sea, and also on mountain tops" (Ridley). It is found on all the hills in open places at about 3000 feet and upwards, and also on the shores of Singapore Island. At Fraser Hill it was found abundantly in exposed situations both below 4000 feet and on the summit of Pine-tree Hill (8738) the highest point reached (4800 feet). Young plants were noticeable in many places by the forest paths.

Ceropteris calomelanos, Und.; van Alderwerelt, p. 528; *Gymnogramme calomelanos* Klf., Ridley p. 48.

This fern is said to have been introduced into Malaysia through cultivation, its original home being tropical America and Africa. It has been collected at many widely separated localities in the Peninsula, the highest altitude recorded being 4000 feet on G. Kerbau. At Fraser Hill it grows abundantly in open places, and is one of the first vascular plants to establish itself on bare ground (8483).

Monogramme paradoxa, Beddome, p. 315, van Alderwerelt, p. 552; *M. junghuhnii* Hk., Ridley p. 48.

On the mountains of Ceylon and southern India, and through Malaysia to Polynesia and Australia. The only other specimens in the Singapore herbarium are from Penang and Singapore. At Fraser Hill it was collected once only, an epiphyte in the forest (8835), but may have been overlooked on account of its small size.

Vittaria elongata, Sw.: van Alderwerelt, p. 556, Ridley, p. 51, Beddome p. 404.

An epiphyte of the rain forests of tropical Africa and Asia, extending through Malaysia to Polynesia and Australia. In Java it does not occur above 5500 feet. In the Peninsula it is common everywhere, in the low country and the hills, probably up to the upper limit of forest. At Fraser Hill it is one of the most abundant epiphytic ferns, and as usual rather variable (8471).

Vittaria pusilla, Bl.; van Alderwerelt, p. 560; *V. falcata*, Kze., Ridley p. 51, Beddome p. 406.

Occurs in Ceylon, Malaysia, the Philippines and Australia. In Java it is an epiphyte of the middle and upper forest zones, amongst moss, and in the Peninsula it appears to be montane, having been found on the main range at G. Berumban in Pahang and Bujong Malacca, on G. Tahan, G. Benom and Mt. Ophir. At Fraser Hill it is a not uncommon epiphyte, sometimes found with fertile fronds less than 5 cm. in length (8461).

Taenitis blechnoides, Sw.; van Alderwerelt, p. 563, Ridley, p. 52, Beddome p. 410.

Occurs in Ceylon and in northern India, and through Malaysia to the Philippines, New Guinea and Polynesia. "Common in woods all over the Peninsula and very variable" (Ridley). At Fraser Hill it is very abundant, especially by paths in the forest, the simple form being most frequent and large pinnate fronds rare (8735).

Polypodium hirtellum, Bl.; van Alderwerelt, p. 582, Ridley, p. 41, Beddome, p. 305.

Found in Ceylon, Malaysia, the Philippines, and New Caledonia. In the Peninsula and in Java it is montane, an epiphyte of mossy tree trunks; it has been collected on Kedah Peak at 2,500 feet, on the main range at G. Berumban and G. Batu Puteh (6,000 feet), on G. Tahan and Mt. Ophir. At Fraser Hill it was found only once (8767).

Polypodium cucullatum, Nees and Bl.; van Alderwerelt, p. 589, Ridley, p. 42, Beddome, p. 307.

Occurs on the hills of Ceylon and southern India at 3,000-5,000 feet, in Malaysia and Polynesia. In Java it is found as an epiphyte from the middle forest zone up to 9,000 feet. In the Peninsula it has been found on the Taiping Hills at 3,000 feet, and on the main range at Bujong Malacca and Bukit Kutu; the specimens so named from G. Tahan appear distinctly different. At Fraser Hill it was noticed only twice (8740), but is easily overlooked on account of its small size.

Polypodium subpinnatifidum, Bl.; van Alderwerelt, p. 590, Ridley, p. 42, Beddome Suppl., p. 86.

Recorded from the Peninsula, Java, and the Philippines (Copeland). In the Peninsula it has only been found on G. Kerbau, Ulu Semangkok and G. Tahan, but the distinction from

P. cornigerum does not seem well-marked. At Fraser Hill an epiphyte in the forest, abundant near Pine-tree Hill and at the highest point reached on G. Ulu Semangkok (8729).

Polypodium obliquatum, Bl.: van Alderwerelt, p. 600, Ridley, p. 42, Beddome, p. 311.

A common epiphyte in Ceylon, in southern India at 4,000-5,000 feet, in Malaysia and the Philippines. In the Peninsula apparently montane, having been collected on the Taiping Hills at 3,000 feet, at Temengo and Telom. At Fraser Hill it is an epiphyte in the forest (8782); observations as to its frequency are inadequate.

Polypodium mollicomum, Nees and Bl.: van Alderwerelt, p. 601; *P. fuscatum*, Bl., Ridley, p. 42, Beddome, p. 311.

This species is recorded from Ceylon and Malaysia. The specimens from Fraser Hill come nearest to it, but differ markedly from those from other localities, in the thinner translucent texture and great development of spreading hairs over the whole plant. Ferns from G. Tahan referred to *P. malaccanum* are in close agreement, differing from the type of the latter species from the top of Mt. Ophir. Other specimens referred to *P. mollicomum* are from G. Bubu and Kedah Peak. At Fraser Hill a fairly common epiphyte (8731).

Polypodium khasyanum, Hk.: van Alderwerelt, p. 603, Ridley, p. 42, Beddome, p. 308.

This species occurs on the Khasya Hills and in Assam at 3,000-4,000 feet, and in the Peninsula has been collected on the Taiping Hills at 4,000 feet, and on G. Pulai in Johore. At Fraser Hill it is an epiphyte, collected once only but possibly not infrequent (8486).

Polypodium serraforme, J. Sm.: van Alderwerelt, p. 615; *Prosaptia Emersoni*, Pr., Ridley, p. 16, Beddome, p. 56.

Found on the hills of southern India and Ceylon, and through Malaysia to the Philippines and to Samoa. In the Peninsula it has been widely collected on the hills from Kedah Peak to G. Pulai in Johore, and at lower altitudes in Malacca and Selangor. At Fraser Hill collected by Mrs. Smith.

Polypodium contiguum, J. Sm.: van Alderwerelt, p. 616; *Prosaptia contigua*, Sw., Ridley, p. 17, Beddome, p. 56.

On the mountains of Ceylon and southern India and through Malaysia to Polynesia. In the Peninsula it has been collected on the Taiping Hills at 3,500 feet, at Telom, on Penang Hill at 2,000 feet, on G. Tahan, by the Tahan river and in Sungei Ujong. At Fraser Hill a fairly common epiphyte (8487).

Polypodium verrucosum, Wall.: van Alderwerelt, p. 619; *Goniophlebium verrucosum*, J. Sm., Ridley, p. 43, Beddome, p. 324.

Through Malaysia and the Philippines to New Guinea and Australia. In the Peninsula not confined to the hills, but collected from few localities. At Fraser Hill it is fairly common as an

epiphyte (8160), sometimes found growing beneath a larger fern, *Asplenium nidus* or *Pleopeltis heraclea*.

Polypodium argutum, Wall.; van Alderwerelt, p. 621; *Goniophlebium argutum*, Wall., Beddome, p. 323.

This species has a distribution in northern India and Luzon. Specimens collected at Fraser Hill in 1919 by Mr. C. Hose and at the Semangkok pass by Mr. Ridley have fewer pinnae than is normal but appear to be referable to it rather than to *P. amaenum* Wall.

Pleopeltis accedens, Bl.; van Alderwerelt, Suppl., p. 376, Ridley, p. 45, Beddome, p. 345.

From Malaysia to New Guinea and Polynesia. In the Peninsula an epiphyte of the hill forests, collected on the Taiping Hills at 3,000 feet, and on the main range from G. Kerbau to Ginting Sempah. At Fraser Hill it was found a few times, growing with *P. Wrayi* and *P. stenophylla* (10022).

Pleopeltis Wrayi, Beddome, Suppl., p. 93, van Alderwerelt, Suppl., p. 316, Ridley, p. 45.

This species has been recorded only from Sumatra and Borneo outside the Peninsula. It occurs on the Taiping Hills at 4,000-5000 feet on the main range from G. Kerbau to Fraser Hill, on G. Tahan and G. Benom. At Fraser Hill it is a common epiphyte (8462, 8488, 8133).

Pleopeltis peltata, Scort.; van Alderwerelt, Suppl., p. 376.

An endemic and montane species, closely allied to *P. superficiale* Bl., and no doubt originated locally from it. *P. peltata* has been found on the Taiping Hills at 3,000-4,000 feet, and on the main range at Telom and on G. Batu Puteh. At Fraser Hill it grows epiphytically in the forest, and was noticed two or three times only (8132).

Pleopeltis stenophylla, Moore.; van Alderwerelt, Suppl., p. 319, Ridley, p. 45, Beddome, p. 348.

In Malaysia, the Philippines and Fiji; in Java an epiphyte of the lower forest zone. In the Peninsula "high up on lofty trees in the low country, on rocks and low trees in the hills" (Ridley). It has been collected on Kedah Peak, on the Taiping Hills at 3,000 feet, at the Semangkok pass, in Johore and on the Islands of Penang and Singapore. At Fraser Hill a common epiphyte (8828).

Pleopeltis subcaudiformis, v. A. v. R., Suppl., p. 384. *Polypodium heterocarpum*, Mett. var. *abbreviatum*, v. A. v. R., p. 677.

Distribution, Malaya (van Alderwerelt). In the Peninsula collected only at Fraser Hill where it is one of the less common epiphytes. The identification is from description only (8834).

Pleopeltis platyphylla, Beddome, Suppl., p. 94, van Alderwerelt, Suppl., p. 386, Ridley, p. 46.

Confined to western Malaysia. In the Peninsula it is montane, having been collected on Kedah Peak, on the Taiping Hills, and

on the main range at Telom and Ginting Sempah. At Fraser Hill it was found once as an epiphyte (a small sterile specimen) and abundantly on the rocks of the mining valley near the stream (8768).

Pleopeltis rupestris, Moore; van Alderwerelt, Suppl., p. 387, Ridley, p. 46, Beddome, Suppl., p. 94.

An epiphyte, confined to Malaysia and the Philippines. In the Peninsula it has been collected only on the Taiping Hills at 3,000 feet and on G. Inas in Perak at 5,000 feet. At Fraser Hill only one small specimen was collected.

Pleopeltis incurvata, Moore; van Alderwerelt, Suppl., p. 399, Ridley, p. 47, Beddome, p. 364.

An epiphyte, confined to Malaysia and the Philippines. In Java it occurs in the lower forest zone. In the Peninsula it is montane, and has been found on Kedah Peak, the Taiping Hills, on the main range from Bujong Malacca to Bukit Hitam in Selangor, and on G. Tahan. At Fraser Hill it is abundant (8484).

Pleopeltis laciniata, Beddome, Suppl., p. 97, Ridley, p. 47, van Alderwerelt, Suppl., p. 399.

Confined to western Malaysia and Celebes. In Java it is an epiphyte of the lower and middle forest zones. In the Peninsula it has been found on the Taiping Hills at 3,500-5,000 feet, and on G. Tahan at 5,000-6,000 feet. At Fraser Hill it was found once only, on South Summits, on the ground in the forest (8815), but probably it is usually epiphytic.

Pleopeltis sp. nov. ? No. 8789. An epiphyte, found once only. It has a pinnatifid frond, like that of *P. laciniata*, but with more distant segments, and scattered superficial sori. Represented also in Mr. Hose's collection.

Pleopeltis heraclea, (Kze.) ; van Alderwerelt, Suppl., p. 403; *Drynaria heracleum*, Moore, Ridley, p. 45, Beddome, Suppl., p. 93.

Occurs throughout Malaysia and in New Guinea. In Java it is a common epiphyte of the lower, and less common in the middle forest zone. In the Peninsula it has been collected on the Taiping Hills at 3,000-4,000 feet, and on Penang Hill. At Fraser Hill it is a common epiphyte (8764), and was found also creeping over the rocks in the cleared mining valley.

Lecanopteris carnosa, Bl.; van Alderwerelt, Suppl., p. 407, Ridley, p. 10.

Confined to Malaysia and the Philippines. In the Peninsula this species is montane, and has been found on the Taiping Hills at 3,000-5,000 feet, on the Telom ridge, and on G. Tahan at 3,000-5,000 feet. Specimens from Singapore referred to this species have scaly rhizomes and medial sori, characteristic of *L. lomarioides*. At Fraser Hill branches of trees were frequently seen covered with the black tuberculous rhizome of this myrmecophilous fern, but well-developed fertile fronds were not often found (8728).

Cyclophorus flocciger, Pr.: van Alderwerelt, p. 687; *Nipholobus fissus*, Beddome, p. 330.

This species occurs on the hills of southern India and Ceylon, in northern India and Malaysia to the Philippines. It has not been definitely recorded from the Peninsula, and the present specimens (8470, 8769), whose fertile fronds are immature, are referred rather doubtfully to it.

Stenochlaena sorbifolia, J. Sm.; Ridley, p. 53, Beddome, p. 423.

A pantropical species, remarkable for the small and variable much-divided sterile leaves which are usually borne by the lower part of the climbing stem. It is distributed throughout the Peninsula and is very abundant at Fraser Hill (8459), but was never found with fertile leaves.

Hymenolepis spicata, Pr.; van Alderwerelt, p. 728; *Gymnopteris spicata*, Beddome, p. 432, Ridley, p. 54.

In Madagascar, Ceylon and southern India, northern India at 4,000-7,000 feet, to southern China, and through Malaysia to Polynesia and Australia. In Java it is found up to 10,000 feet. In the Peninsula it has been found on the Taiping Hills at 3-4,000 feet, on Kedah Peak, on the main range from Telom to Fraser Hill, and on Penang Island and Pulau Tioman. At Fraser Hill it one of the less frequent epiphytes (8766).

Photinopteris speciosa Bl.: van Alderwerelt, p. 731; *P. rigida* Bedd.; Ridley p. 55, Beddome p. 442.

Confined to Malaysia and the Philippines. In Java it is an epiphyte of the lower forest zone, at 1500 to 4000 feet. In the Peninsula "on boughs of trees, overhanging rivers and mangrove swamps" (Ridley); it has been collected in Singapore and Johore, on Penang Hill, and on the Taiping Hills at 300-2000 feet. At Fraser Hill it was found only in the mining valley, on rocks in the open (8845).

Cheiropleuria bicuspis Pr.: van Alderwerelt p. 732; *Chrysodium bicuspe* Hk., Ridley p. 55.

Occurring throughout Malaysia, extends to the Philippines, Formosa and New Guinea. In Java it is a rare ground fern, found at 5000 feet; in the Peninsula it is found on the Taiping Hills, on the main range from G. Kerbau to Fraser Hill, on G. Tahan and Mt. Ophir. At Fraser Hill found once only (8482). On the ground in the forest on North Ridge.

Leptochilus heteroclitus C. Chr.: van Alderwerelt p. 739; *Gymnopteris flagellifera* Beddome, p. 433, Ridley p. 54.

Generally distributed through tropical Asia, and through Malaysia to the Pacific. In the Peninsula found at low altitudes in Johore and Singapore, at Gopong in Perak, and in Penang and Lankawi Islands; it grows in wet ground in forests. Mrs. Smith sent a small fertile specimen from Fraser Hill labelled "on log over stream, 4000 feet," which is probably referable to this species.

Ophioglossum pendulum L.; van Alderwerelt p. 777. Ridley p. 59, Beddome p. 465.

Occurs throughout southern Asia, Malaysia, Polynesia and northern Australia. In the Peninsula it is probably of general occurrence, but has only been collected on the Islands of Singapore and Penang, at Rawang in Selangor, and on G. Batu Puteh. At Fraser Hill it was noticed only twice, once hanging below *Asplenium nidus* (8761).

Angiopteris evecta Hoffm.; van Alderwerelt p. 762. Ridley p. 58, Beddome p. 460.

Distributed from Madagascar, Ceylon and southern India, through northern India to southern China and Japan, and through Malaysia to Polynesia and Australia. In Java it is a common ground fern of the lower forest zone, and in the Peninsula is probably of general occurrence, but has only been collected on the Taiping Hills (up to 3000 feet), at Temengo and Telom, at Pekan, and on Singapore Island. At Fraser Hill, found only in the mining valley below 4000 feet, in shady places, becoming abundant at about 3500 feet (8847).

FERN ALLIES.

Selaginella atroviridis Spring: Ridley Fern Allies p. 153.

Distributed from British India and China to New Guinea, and collected from many localities in the Peninsula, from Perak to Singapore, not confined to the hills. At Fraser Hill it is abundant on the ground in the forest (8153).

Selaginella brachystachya Spring: Ridley Fern Allies p. 159.

In south India and Ceylon, and in western Malaysia. In the Peninsula it appears to be montane, being found on the Taiping Hills, at Telom, and on G. Tahan. At Fraser Hill noticed only by the path to the Gap. (8822).

Selaginella Wallichii Spring: Ridley Fern Allies p. 153.

Distributed from Assam through Malaysia to New Guinea. In the Peninsula collected at many localities in lowland forests, and on the hills up to 3-4000 feet. At Fraser Hill not abundant (8819).

Lycopodium cernuum L.: Ridley Fern Allies p. 144.

A species of worldwide distribution, abundant everywhere in the Peninsula. It is one of the first vascular plants to establish itself on new ground in exposed places, notably on levelled house-sites.

Lycopodium phlegmaria L.; Ridley Fern Allies p. 143.

Paleotropical, and in Queensland and New Zealand. In the Peninsula it has been found in many localities, at altitudes up to 5000 feet (G. Kerbau). At Fraser Hill it is frequent, but not abundant (8788).

MOSSES.

Acanthocladium scabrifolium Broth. No. 8730. "Agrees with the description quite well. It has only been found once before, in Java; cf. Hedwig. LX, 327 (1819). The fruit has never been described." (Dixon).

Braunfelsia sp. nov. No. 8838. The leaves are closely imbricated, and the plant having a tufted habit was saturated with water like a sponge. Found on a tree by the path to Pine-tree Hill.

Ctenidium sp. nov. No. 8715 d. Closely allied to *C. stereodontoides* Dixon from S. India.

Dicranoloma sumatrana Broth. This species, otherwise only known from Sumatra, was collected by Mr. Ridley at Sempang mines

Distichophyllum Mittenii Bry. jav. Nos. 8708, 8712. Distribution: Ceylon, Java, New Caledonia. Previously found on the Taiping Hills and Ulu Temengo in Perak, and at Kukub in Johore. On a log in deep shade in Reservoir Valley.

Ectropothecium Moritzii (C.M.) Jaeg. No. 8713. Distribution: Java, Borneo, Celebes. Collected also on Penang Hill and G. Tampin.

Endotrichella elegans (Doz. & Molk.) Fl. No. 8821. Distribution: Sumatra, Java, Celebes, Philippines. Previously found on the main range at G. Kerbau and Telom.

Isopterygium albescens (Schwaeg.) Jaeg. No. 9181. Distribution: Nilghiris, Himalayas from Nepal to Assam, Java, Borneo, Celebes, Japan. Previously found at Batu Caves, Selangor, and in the Botanic Gardens, Singapore.

Pogonatum convolutum (L.) var. **cirratum** (Brid.) Par. No. 8469. A new record for the Peninsula.

Pogonatum macrophyllum Bry. jav. No. 8467. Distribution: Java, Sumatra, Batjan. Apparently a montane species in the Peninsula being found on the Taiping Hills, on the main range from G. Berumban and Bujong Malacca to Bukit Hitam, on G. Benom, Mt. Ophir and the hills of Penang. Abundant at Fraser Hill

Pogonatum Neesii C. M. Nos. 8458, 8716. Found by Mr. Ridley at or near Fraser Hill, this species has not been recorded elsewhere in the Peninsula; it is known from the Nilghiris and Java. It is the first plant to colonize the bare ground of levelled house-sites and is very abundant.

Rhacelopus pilifer D. & M. No. 8772. Distribution: Tonkin, Java, Borneo, Batjan, New Guinea. This species is recorded from the Taiping Hills and from several points on the main range from Perak to G. Tampin. Not uncommon in the jungle on rocks and also on bare ground by paths.

Rhizogonium spiniforme (L.) Bruch. No. 8468. Occurs everywhere in mountain forests of the tropics and subtropics, and

is widely distributed in the Peninsula from Kedah to Singapore, not confined to the hills.

Schistomitrium apiculatum D. & M. No. 8823. A Malaysian species, not recorded from other localities in the Peninsula. Collected on a tree in the forest on South Summits.

Sematophyllum sp. nov. No. 8711. Found on a tree in Reservoir Valley.

Sematophyllum secundum (Rw. and Hornsch.) var. **angustifolium** Fl. Nos. 8398, 8715 e, 8741, 8910. This variety occurs also on G. Raya, Lankawi Islands; at Fraser Hill it was abundantly fruiting. *S. secundum* is a Malaysian species, and has been found on G. Kerbau and Penang Hill.

Sematophyllum sigmatodontium (C. M.) Jaeg. Distribution; Java, Sumatra, New Guinea. This species was found by Mr. Ridley at or near Fraser Hill, and has also been collected on Penang Hill and on G. Tunduk, Malacca.

Taxithelium capillipes (Bry. jav.) Broth. No. 8454. Distribution; Sumatra, Java. It has been found on Penang Hill and in mangrove, amongst *Acrostichum aureum*, at Port Swettenham.

Trichosteleum Boschii (D. & M.) Jaeg. Nos. 8715 b, 8783. Distribution; Siam and western Malaysia. This species has been collected on the hills of Perak and Penang, in the Telok Reserve, Klang, and on G. Pantaj in Johore.

Trichosteleum hamatum (D. & M.) Jaeg. Nos. 8709, 8715 c, 8781. Distribution; Malaysia and the Philippines. New to the Singapore collection.

Trichosteleum sp. nov. No. 8715a. Found in Reservoir Valley, in a tuft consisting of *T. Boschii*, *T. hamatum*, etc.

Trismegistia rigida (Rw. & H.) Broth. No. 8399. A Malaysian species, extending to New Guinea and New Caledonia; it has also been found on G. Raya, Lankawi.

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